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To what extent do university students in Saudi Arabia find a social media tool (Twitter) useful
in their respective learning environments?

By

Abdullah Zaid Almankory

A thesis submitted in partial fulfilment of the requirements of the
degree of Doctor of Education at the University of Durham

School of Education

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Abstract

This research examines and evaluates students' perceptions of the effectiveness of social media (Twitter) in their learning environment. The investigation was conducted in a university located in Saudi Arabia. Twitter was integrated into the learning environment to precisely examine the potential of social media in education. The study attempts to address the research topic from several aspects: examining the challenges that students face during the integration, evaluating and discovering possible pitfalls associated with social media and education, evaluating the positive capacity of Twitter in learning and as a pedagogical tool, and investigating students' educational engagement through the social media platform.

A mixed-methods approach was conducted for data collection, including quantitative (online questionnaires) and qualitative (face-to-face interviews) methods. The obtained data were analysed quantitatively using descriptive and inferential statistics analysis, including exploratory factor analysis using the Statistical Package for Social Sciences (SPSS), and qualitatively through thematic analysis.

The analysis of students' perspectives revealed that they had positive Twitter experiences, and they expressed that utilising Twitter can facilitate and improve their educational activities, including knowledge sharing, communication, interaction and collaboration, questioning, and finding answers. The analysis also revealed that they believed that Twitter is a supportive tool that '*often*' increases students' engagement in educational activities, such as being involved in discussions and asking questions.

In relation to some of the students' preferences, it was revealed that there were few concerns related to privacy. In addition, interviews revealed there was a small amount of non-academic interaction *via* Twitter as well as difficulties in accessing the platform, including the internet services.

The study highlights the process of integrating Twitter in learning, as this could increase its positive impact; the process includes the provision of a general induction, an explanation of the purpose, and how students might achieve their goal.

The study is important as it provides an overall picture of the use of social media in higher education. It also assists in the development of integrating social media, particularly Twitter, in general academic practice or in the learning environment.

Declaration

This thesis is as a result of my research and has not been submitted for any other degree in any other university.

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List of abbreviations

Exploratory factor analysis (EFA)

Confirmatory factor analysis (CFA)

More knowledgeable other (MKO)

Zone of proximal development (ZPD)

Social network sites (SNSs)

Chapter 1: Introduction

1.1 General introduction

The rapid growth of social media technologies over the last decade requires more attention from researchers to investigate the potential they offer to society. In 2015, a study assessing growth in the use of social network sites among adults in the USA found that approximately 65% of adults used social network sites, compared to 2005, when only 7% of adults had used social networking (Perrin, 2015). This growth has generated opportunities and risks, both for educational institutions and businesses (Tomayess, Pedro, & Piet, 2015). There is a rapidly growing amount of literature on the use of social media in education, including Twitter, showing both positive and negative findings (Grosseck & Holotescu, 2008; Junco, Heiberger, & Loken, 2011; Knight & Kaye, 2014). Additionally, cutting-edge technology, including social media, not only provides new possibilities, but also brings challenges to the education discipline (Conole & Alevizou, 2010). Social media tools are different in their aims and popularity; not all tools are as popular as others and only some popular tools, such as Twitter and Facebook, have been examined in education. Twitter appears to be one of the most suitable means for education (McNeill, Rice, & Wright, 2016). Likewise, Twitter is the most popular social media tool used by university students in Saudi Arabia (Alwagait, Shahzad, & Alim, 2014). Integrating social media into any educational environment involves challenges; therefore, assessing and understanding these challenges appears worthwhile. Issues about integrating social media (Twitter) in an educational environment in Saudi Arabia are explored based on undergraduates' perspectives; the students all had experience of using Twitter during their study. The main research question was 'To what extent do university students in Saudi Arabia find a social media tool (Twitter) useful in their respective learning environments?' The research used a mixed-methods design with a combination of approaches. Descriptive and inferential analysis of 144 questionnaires and 10 interviews revealed positive outcomes towards the use of Twitter in learning environments, expressing that learning with Twitter can improve and facilitate access to activities, sharing knowledge, communication, interaction and collaboration, questioning, finding answers, and understanding educational topics. Additionally, it helps in enhancing self-confidence and self-assessment, along with changing the format of traditional classes.

The outline of this chapter is as follows. Firstly, the differences between social media and social network are highlighted, after which there will be a discussion regarding whether Twitter should be classified as social media or a social network. The background of social media in education will then be presented along with the theoretical background for the current research. Finally, the chapter discusses the rationales for choosing Twitter and presents the research objectives and questions.

1.2 Social media vs social networks

The research is focussed on the social media tool, Twitter. It is important to make a distinction between or highlight the similarities of the two key terms of social media and social networks. This is fundamental in two aspects; first, identifying the differences is an ideal way of gaining an in-depth understanding of the technology. Second, this influences the chosen terms and definitions for the research topic. Therefore, this section provides a definition of the terms ‘social media’ and ‘social network’ and highlights their main differences.

These terms are utilised in different ways in the literature of different fields, and while researchers consider social media and social networks to have different qualities, others apply them interchangeably, using social networks as an example of social media. According to Ellison (2007), social network sites (SNSs) can be defined as an online application on which people can create accounts and public profiles to communicate, interact, and meet with new or old friends, who share mutual interests. Social networks are generally defined as ‘web-based services’ that enable users to build a ‘public or semi-public profile within a bounded system’ (Ellison, 2007, p. 211). Knight and Kaye (2014) define social networks as ‘web-based systems that provide a social space for users to construct a profile and make links with users who have similar interests or connections’.

A related point to consider is that social network sites also emerge in typical discourse as an interchangeable term for ‘social *networking* sites’. However, the term ‘networking’ may not be selected in some literature due to its scope and emphasis. To illustrate this point, networking has a probable emphasis on the active relationships among strangers, while this is not the key practice of many social network sites (Ellison, 2007). These sites certainly allow users to meet with strangers (networking), a benefit that is otherwise impossible, but the more common goal is to communicate with people who are already part of their offline connection (Ellison, 2007; Haythornthwaite, 2005).

Social media, on the other hand, broadly refers to ‘the many relatively inexpensive and widely accessible electronic tools that enable anyone to publish and access information, collaborate on a common effort, or build relationships’ (Jue, Marr, & Kassotakis, 2009, p. 4). Furthermore, Kietzmann, Hermkens, McCarthy, and Silvestre (2011, p. 241) consider social media as employing ‘mobile and web-based technologies to generate highly interactive platforms *via* which individuals and communities share, co-create, discuss and modify user-generated content’. A recent definition is referred to by Poore (2016), who elucidated social media as a term that encompasses all types of digital technologies that people use to communicate and share information or content amongst each other, through internet services, including blogs, wikis, Twitter, Facebook, and YouTube. Although all types of social media platforms essentially have

different purposes, there are certain common components of ‘interactivity’ regarding features such as ‘like’, ‘recommend’, ‘share’, ‘comment’, and ‘reply’.

Some definitions of social networks place emphasis on the notion of their being ‘bounded’ because communication takes place within closed networks of friends, yet the concept of social media is that of a ‘publishing-orientated medium’. In other words, social networks are considered to be friend-based networks that develop and maintain such friendships. In contrast, social media is designed for users who intend to disseminate content to known or unknown audiences through publishers (Murthy, 2013). Within the scope of this review, social media and social networks emphasise different factors: social media relates to the public and wide-open nature of the platform (one to many), whereas social networks relate to the private and friend-based nature of the platform (one to one). (see Table 1.1)

Table 1.1: The key difference between Social media and social network

Social Media	Social Network
Sharing any kind of information widely	Existing between individuals or organisations (common interest or goal)
Every individual can access the information	Access can be limited to members only
Public	Only limited number of people in communities
YouTube and Twitter	WhatsApp

To conclude, it can be argued that social media is a broad term that can be used to describe any type of technological system relevant to communication, networking, participation, creativity, and collaboration (Poore, 2016; Tess, 2013). A social network is not as broad as social media. As a result, an accurate difference between these two terms may be elusive (Tess, 2013). Following this discussion, the next section will describe Twitter in depth.

1.2.1 Twitter as a social medium and social networking tool

This section will define Twitter and describe its capacity, after which Twitter will be discussed in relation to whether it should be classified as social media or a social network. This section will also continue to explain terms relevant to Twitter.

Twitter is a free, real-time microblogging service on which people respond to the implied question ‘what’s happening?’ On Twitter, anyone can tweet, retweet, participate in ‘hashtag’ exchanges,

and respond to either known, or unknown, people; users can tweet publicly or directly to specific people by mentioning their accounts (Murthy, 2013). Hashtags are commonly used to follow a conversation and categorise the subject and events; for instance, #Edtech could be used to discuss educational technology and #social_network could be used to follow a thread about social networking. Due to the fact that hashtags represent a group of selected concepts, tweets and conversations are generated in an organised way. Nevertheless, even though users tweet under particular hashtags, this does not guarantee that they are conversing with each other in the traditional sense (Murthy, 2018). Twitter users can also follow and invite others, set up lists, and send public tweets. Moreover, they can send direct messages between each other by simply adding @ and the main receiver's username, such as @Abdullah, although this can be seen publicly. Another method of sending direct messages is known as private direct messaging, which cannot be seen publicly as it is only between the sender and receiver (Murthy, 2013; Poore, 2016). In this regard, Neal (2012) and Seo (2012) concede that the concept of Twitter does not exist simply to promote shared interests and information, but also to encourage conversations and promote community exchanges.

Twitter is designed to ease interactive multicasting through the broadcasting of many-to-many, while traditional media, such as television and radio, were developed to broadcast one-to-many (Murthy, 2013). This multicast characteristic opens up opportunities for everyone to generate and become involved in discussions, and consequently, reaching the desired information on Twitter can be accomplished *via* many resources at any time through different types of electronic devices, such as a personal computer or mobile phone.

It is worth mentioning that the features and capacities of Twitter are consistently developing, such as the number of characters that can be used in a single tweet. Before extending the character limit in a single tweet to 280, Twitter's 140-character message limit had given rise to concerns about its efficacy in the classroom, although some researchers had no such worry, emphasising Twitter as a microblogging medium that does not require a huge quantity of characters due to its ability to accommodate discourse in an efficient and concise manner (Grosseck & Holotescu, 2008; Seo, 2012). Nevertheless, although Arabic-language tweets are also limited to 140 characters, the nature of the language allows users to convey more thoughts with fewer characters compared to English. For example, the number of characters in the title of this study is counted as 126 in English:

'To what extent do university students in Saudi Arabia find social media tools useful in their respective learning environments?'

However, in Arabic, this is equivalent to 109 characters:

‘الي اي مدى يجدون طلاب الجامعات في المملكة العربية السعودية شبكات التواصل الاجتماعية مفيدة لهم في بيئات التعلم’

Summers (2010) compares different languages in terms of length and meaning in tweets by running the measure against several users in Twitter, gaining these approximate results (see Table 1.2):

Table 1.2: Equivalent limits

N	Language	Equivalent length in English
1	Russian	145
2	Farsi/Persian	170
3	Arabic	175
4	Thai	185
5	Japanese	260

Furthermore, to support this view, Aliza (2017) acknowledged that the number of characters that convey information varies among languages. For instance, languages such as Japanese, Chinese, and Korean differ from other languages such as English, French, Spanish, or Portuguese in terms of the amount of information that is carried in a single letter. Their finding discovered that ‘the character limit is a major cause of frustration for people tweeting in English, but it is not for those tweeting in Japanese’. Consequently, after eleven years, Twitter has recently doubled the character limit from 140 to 280 to allow individuals to express themselves more clearly (Aliza R, 2017; Murthy, 2018). This is a clear indication that Twitter management teams are continually developing the services provided by Twitter in response to users’ points of view.

Twitter is known as a popular microblogging tool and ‘a collaborative technology with a growing interest from users coming from different domains, from eLearning and education in general too’ (Grosseck & Holotescu, 2008, p. 1). The essential difference between a microblog and a blog is that a microblog is shorter in terms of the length of its text. This shortened length leads to faster and more active updating *via* microblogs, as the average micro blogger can update their content several times a day, while a blogger might only be able to update it every few days (Java, Song, Finin, & Tseng, 2007). Microblogging also ‘enables real-time interaction’ (Grosseck & Holotescu, 2008). This occurs between people through the use of different types of devices due to their updating speed. A further key feature of microblogging is that it is not restricted to a limited range of text, as photos, hyperlinks, sounds, and videos can all be included. This could increase the richness of information conveyed in a single tweet.

Twitter has been described by some researchers as a social media tool, with Evans (2014) and Murthy (2013) stating that the platform is one of the largest and most popular social media websites available. On the other hand, others refer to Twitter as a social networking tool. For example, ‘Twitter is the second most popular social network after Facebook’ (eBizMBA, 2015a).

Therefore, taking into consideration the previous discussions during which social media and social networks were defined and based on Twitter's nature, features, and users' objectives, the platform is seen as a social media tool that encompasses social network facilities. Hence, social networks, blogs, and microblogs can be frequently given as examples of social media in the general literature.

1.3 Brief background of social media in education

This section provides a broad picture of the current status of social media in educational settings, potential reasons of utilising social media in education, and its possible benefits.

The popularity of social media has attracted the attention of educators who are now using this technological tool within various disciplines in universities around the world. Social media has been adopted at universities in the Asia-Pacific Region, Europe, the Mediterranean, Turkey, North America, Mexico, the Middle East, and Africa (Tomayess *et al.*, 2015), with this global process of adoption reflecting the current importance of social media in human life in general and, in particular, the educational environment. To support this view, Poore (2016) acknowledges that integrating social media in educational disciplines contributes to a wide range of opportunities, such as for the benefit for intellect, communication, collaboration, participation, socialisation, motivation, management, and administration. These opportunities are presented in Figure 1.1.

The use of social media for educational purposes has the potential to alter learning and teaching approaches in higher education. The concept is that learners gain more knowledge when they are encouraged to actively engage with teaching content using methods with which individual's construct meaning and knowledge innovatively within a social environment. Through the use of social media, some students may become more independent, confident, and successful, specifically at university and in the workforce, as these tools allow them to generate and participate in discussions, interact with other students, and with their instructors (Issa, 2014; Poore, 2016). Likewise, Issa, Isaias, and Kommers (2015) state that social media eases the exchange of ideas, communication, collaboration, and connections amongst people from diverse backgrounds, as well as enabling people to post, publish, and comment on topics of interest. This is consistent with other studies, which found that tools such as these assist learners with interacting with peers and lecturers (Issa, 2014) and actively enhance students' learning and engagement (West, Moore, & Barry, 2015). In this regard, Junco and Cole-Avent (2008, p. 14) highlight that 'there are plenty of opportunities for student affairs professionals to use technology to help students engage with their institution, enhance their learning, and improve their academic and psychosocial experiences'. Hence, these opportunities could lead students to learn more

actively and productively in their own learning environment because social media places education, rather than the teacher, at the centre of the learning environment (Poore, 2016, p. 7).

A further possibility is that social media are great tools for socialising and linking students to online communities, as well as allowing them to practice actual online communications. This provides flexibility for learners as they can use and choose a connecting tool that is more meaningful to them rather than being limited to a particular means. In this regard, a related study by Liang, Commins, and Duffy (2010) concluded that learning and relationships are key components towards accomplishing positive outcomes, and that educators might consider social media, which is attractive to learners, to enhance their efforts in an educational setting. However, even though social software offers a great opportunity for pedagogical practice, it is crucial to be aware of its dynamic and potential weaknesses, as these could lead to the notion that a self-organising environment may not, necessarily, be an effective learning environment (Dron, 2007).

Social media in an educational environment leads some research to state that these tools have an important role in the academic world, especially in supporting learning and teaching methods (Sobaih, Moustafa, Ghandforoush, & Khan, 2016, p. 296). Integrating such tools allows students to succeed in practicing digital skills they may need in the future. Importantly, new technology is likely to come with greater technical capability and higher utility. A related study stated that current technologies will be replaced by newer ones, so it is crucial for student affairs professionals to adopt advanced technologies to fulfil students' needs in education (Junco & Cole-Avent, 2008). However, to achieve the desirable benefits, comprehensive higher-order cognitive activities and solid educational designs are required rather than simple add-ons to existing educational practices.

Managing social media platforms and their content is also a fundamental aspect in linking students with each other. Constructing educational experience is required in the way that allows users of content to organise their tasks around the rapid movement of technology (Väljataga & Fiedler, 2009). To accomplish high levels of interaction, the use of social media for learners requires establishing new norms of behaviour and creating a positive online learning environment along with monitoring and evaluation. This will be discussed further in the literature review chapter.

These tools are not a solution for all educational dilemmas, as some researchers have warned about the risks associated with the use of social media in educational settings. For instance, social media is seen as a distraction rather than aiding focus and is also seen as a time-consuming tool that provides users with low levels of privacy (Grosbeck & Holotescu, 2008; Poore, 2016). It is also important to emphasise that educational tasks require deep, rather than superficial, engagement, as is the case when technology is used. Planning and designing the utilities of social media correctly, in accordance to classroom requirements can have a significant impact on accomplishing high levels of success during the integration of these tools into the classroom. To

support this, Poore (2016) states that using social media correctly can be very beneficial to the educational discipline, depending on the task and type of media implemented.

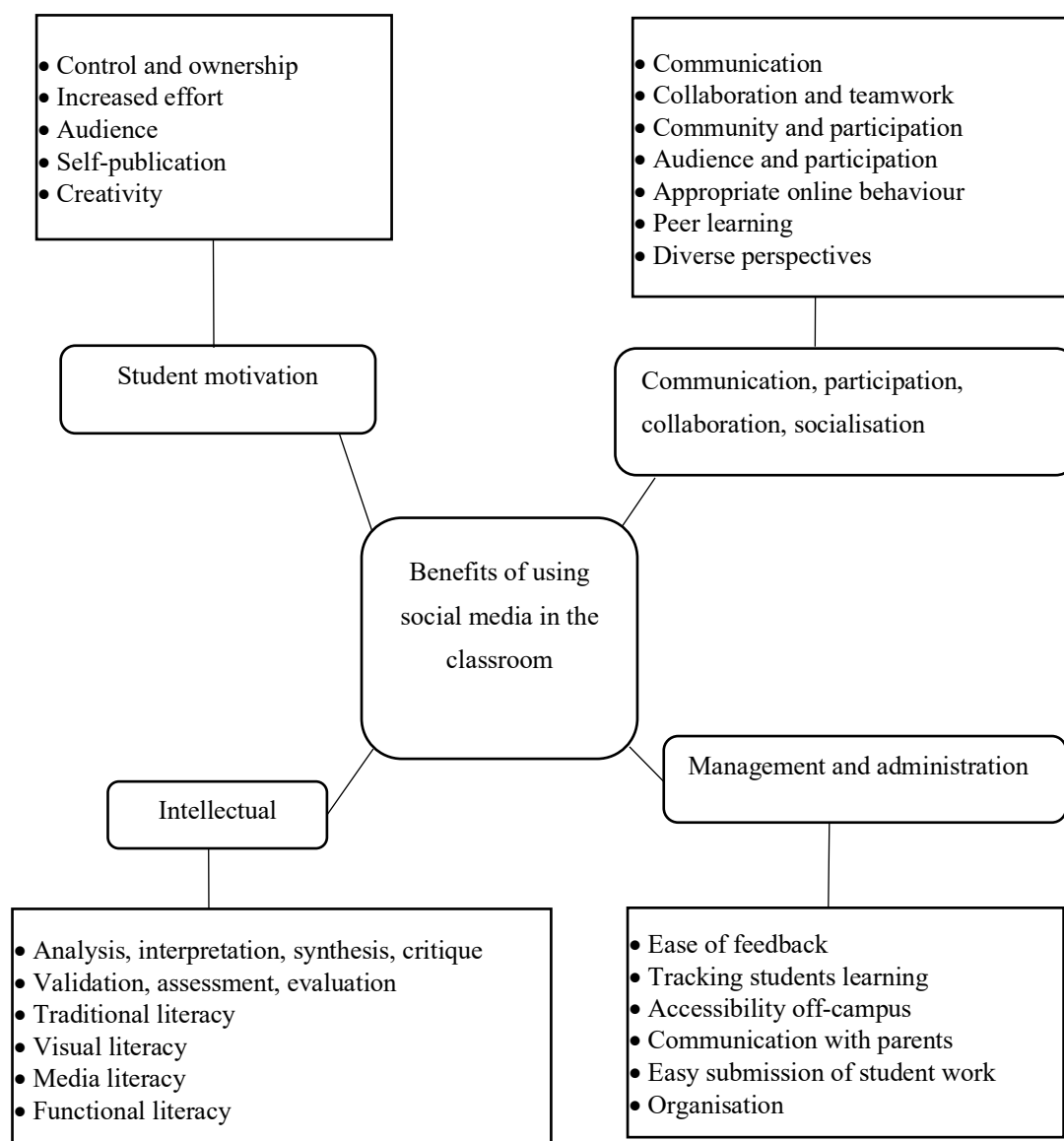


Figure 1.1: Opportunities of social media

To summarise, even though social media appears to be a potentially effective tool in various educational aspects, there are some concerns related to the nature of the technology. Maximising and minimising the benefits of social media may depend on several aspects of practice along with specific types of implemented technology.

1.4 Some possible ways of using Twitter in education

Twitter has no particular method of application in a learning environment; it was not designed as an educational tool, so it depends on the educational needs, activities, goals and contexts in which Twitter is used as well as the process of integrating Twitter into an educational setting. Twitter can be integrated into the educational discipline, by users being classified into two types: micro and macro. When Twitter is used with a small defined group, when tweeting questions, or when involved in a class or lecture discussion, this is known as micro use. However, when tweets reach more or unlimited audiences, this is known as a macro use (Chamberlin & Lehmann, 2011). When tweets occur through a live lecture it is identified as a backchannel with features such as changing the layout of the lecture, developing points made, or speeding up the lecture if the audience are familiar with the subject. This approach allows the instructors to hear questions from all people in the lecture, including silent ones, and helps the instructor to clarify points in the area for which most students post questions (Chamberlin & Lehmann, 2011). To support this finding, Dron (2007) declared that, although the instructor may have a relatively small part in monitoring activities *via* social software, these tools are likely to provide information and details to the instructors about members of their groups, such as their strengths, needs, preferences, weaknesses, and interests. Furthermore, according to extant literature, Twitter is identified as an instant feedback tool during lectures, which spreads information in real time (Parry, 2008; Richardson, 2010).

Twitter is considered as a new form of learning tool that supports communication, thereby informal learning beyond the institution occurs (Ebner, Lienhardt, Rohs, & Meyer, 2010). It also acknowledged as an active learning tool (Cherney, 2008). There are other possible educational uses such as exploring collaborative writing, assessing opinions, and facilitating virtual classroom discourse (Grosseck & Holotescu, 2008).

It should be highlighted that allowing students to study on their own on Twitter without any lead from an instructor may not always be successful. For instance, Chamberlin and Lehmann (2011, p. 390) report that some instructors experience failure when using Twitter for educational purposes; an experience was reported, thus: 'Reason for the FAIL? I think it was because I didn't participate as much. Students want to imitate someone's lead ... when I do not actively lead, they do not take up the work on their own'. This indication highlights the role of the instructor in learning activities related to technology, if the tool is to be successfully implemented.

1.5 Context of the study

1.5.1 Brief overview of universities in Saudi Arabia

The Kingdom of Saudi Arabia is an Arabic and Islamic state, located in western Asia. It is known as a developing country, ranked as first in the production and reserves of petroleum, fifth in natural gas reserves, and tenth in natural gas production (Ministry of Education, 2019). This has an impact on the development of several sectors, including higher education. During the past two decades, higher education in Saudi Arabia has been significantly expanded and improved. Education is a nationwide system, which includes 26 government universities and 13 private universities. These universities are distributed geographically across the country. Although these universities are highly independent in both administrative and academic contexts, they are nonetheless associated with the Ministry of Education (Ministry of Education, 2018a, 2018c). According to statistics reported by the Ministry of Education (2018b), during the period 2016–2017 the total number of fresher students who registered for a bachelor's degree was 291,862. Even though the Ministry of Education has several objectives, the objective most related to the current study is that of optimally employing information and telecommunication technology in educational settings (Ministry of Education, 2018a).

1.5.2 University of Hail where the study was implemented: A brief overview

The University of Hail is located in the growing city of Hail in the northern centre of the Kingdom of Saudi Arabia. It is a government university, which was founded in 2005, and provides good quality education to all people in the region, in line with labour market needs (see Figure 1.2 for more information). The university aims to provide excellent education, community service, and research studies to further develop society and its knowledge. The university offers an effective teaching and learning environment, using new and emerging technologies and strategies to approach these goals (University of Hail, 2018). Looking from a statistical perspective, the total number of fresher students (first year) during the period 2016–2017 was 7,545, whereas the number of remaining learners was 34,577 (Ministry of Education, 2018b). In addition, the adopted university procedure follows a semester-based calendar; students have five years to complete their course, including a preparatory year. The university has two separate campuses, as per Islamic regulations – one for men and another for women. Each of these campuses provides cultural, recreational, and athletic facilities. Students join the university for their preparatory year after completing their 12th year of general education. Thereafter, students can choose their specific discipline according to their preferences and grade point average (GPA).

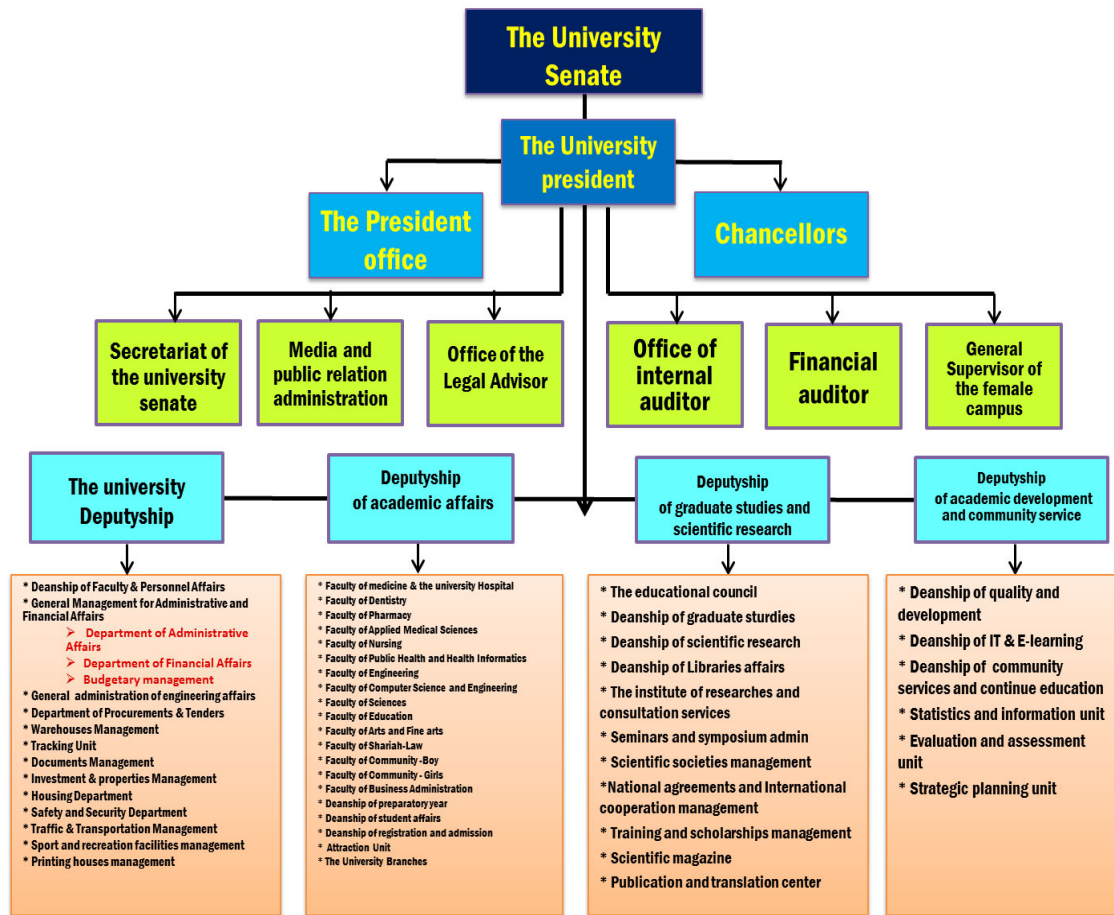


Figure 1.2: The overall structure of the university

1.5.3 Study setting

The University of Hail, particularly the College of Education, undertakes several educator preparation programmes to meet the educational needs of the community. Educational technology is a supportive programme in the College of Education offering effective modules to prepare undergraduate students in the use of technology, which will support their learning and future employment. In this programme, there are several compulsory modules for all students who are enrolled in the College of Education (both males and females, although separately). These modules are available during both semesters of the year. The nature of study often takes the form of lectures and seminars. Assessment of these modules is based on exams: a 40% midterm exam and activities completed during the semester and a 60% final exam. It should be highlighted that the study had access to male students only, due to university regulations and the cultural context of Saudi Arabia.

Twitter was introduced in educational technology classes and students were encouraged to use Twitter within their learning environment for approximately seven to eight weeks, excluding the

time taken to collect data. Students utilised Twitter in eight classes and 20–30 students enrolled in each class, according to their preferences. Initially, eight Twitter accounts were created for this project and each class was assigned to an account. Afterwards, each lecturer was given his class's Twitter account. Subsequently, students were introduced to their class account and encouraged to follow their account and turn notifications on, so they could be informed easily and directly when tweets were produced.

It is worth noting that all students attended an induction session on how to use Twitter appropriately for educational activities. The induction session highlighted two aspects: a general introduction (how to use Twitter in general) and a specific introduction (how to use Twitter for academic learning). The specific introduction included several points, which are summarised below.

- Helping students open a Twitter account for those who had not used Twitter before;
- Explaining how they can use Twitter to reply to questions effectively and avoid losing tweets;
- Explaining how they can utilise selected hashtags (#);
- Communicating *via* public and private channels (tweets and direct messages);
- Using the mention function (@); and
- Using two Twitter accounts *via* a single app.

Both students and instructors used Twitter to perform several educational activities. Students used the platform to support their learning, i.e. tweeting about lectures, asking questions, discussing concerns and ideas, and participating in the 'classroom hashtag'. Students were also encouraged to create a face-to-face group presentation/discussion showing what they had learned from information tracked *via* Twitter. This was a unique and interesting approach for introducing social learning and peer collaboration alongside teaching.

Although the process of implementing Twitter into the classroom appears to be an experimental design, the current study did not use a control group to change the way students use Twitter during the course and then evaluate the change. The research aims were simply to observe the use of Twitter with no direct interference or manipulation of any kind. It focused on exploring the value of Twitter as a contribution to students learning, in, and beyond, classroom time from students' perspectives. A full description of the study design and approach can be found in the methodology chapter.

Table 1.3 shows which activities were used the most by students and lecturers through Twitter.

Table 1.3: Activities through Twitter

N	Activities	Involvement
1	Following the classroom Twitter account	Students
2	Using Twitter inside the class	Students and lecturers
3	Using Twitter outside the class	Students and lecturers
4	Communicating with each other <i>via</i> twitter	Students and lecturers
5	Responding to posed questions by lecturers	Students
6	Responding to posed questions by students	Students and lecturers
7	Sharing photos relating to the lessons	Students and lecturers
8	Sharing videos relating to the lessons	Students and lecturers
9	Classroom news	Students and lecturers
10	Creating a hashtag for a specific academic topic or concept	Lecturers
11	Using hashtags to revise a unit created by lecturers	Students and lecturers
12	Using hashtags to discuss ideas created by lecturers	Students and lecturers
13	Communicating with the lecturer using private messages	Students and lecturers
14	Sharing extra materials relating to the topic for information only	Students and lecturers
15	Using a Twitter poll	Lecturers
16	Retweeting students' tweets using the class account	Lecturers
17	Using the 'like' function through the class account	Lecturers

1.6 Rationale for choosing Twitter

This current section describes the basic rationale for selecting social media in general, and Twitter in particular, as a specific research focus. This section sets out four basic reasons labelled as educational, geographical, technological, and personal reasons. This section will highlight the broad rationale and concepts, and an in-depth discussion will be postponed until the next chapter and the literature review.

1.6.1 Educational rationales

Discovering the effectiveness of a new technology in the educational environment is recommended by researchers. To support this point, Selwyn (2007) argues that ‘Despite the immediate appeal of applications such as Facebook and Second Life, it is necessary for educators to take time to reflect carefully upon the nature of these Web 2.0 applications as online learning environments and question the learning affordances they offer in practice’. Therefore, conducting research, in areas that are associated with the educational environment, is necessary. Furthermore, engagement with social media seems to be growing in educational arenas, as social media use in educational contexts has rapidly increased from 3% to 38%, whereas the usage of webmail decreased from 68% to 38% between 2005 and 2009 (Judd, 2010). This growth can be seen as a good indicator for conducting a study to take advantage of these platforms in a learning environment.

An additional rationale is Twitter’s affordance in the educational discipline. For instance, Goodyear, Casey, and Kirk (2014) acknowledge that social media, such as Twitter, presents itself as a novel method for professional learning that supports pedagogical change, wherein interaction *via* this tool may promote instructor inquiry, working together, and developing shared practices. Likewise, according to McNeill *et al.* (2016), Twitter and YouTube, in particular, are the types of social media platforms that seem to be gaining more interaction in numerous classroom settings. Moreover, the study conducted by Poellhuber, Anderson, and Roy (2011) found that a growing number of students favour social media tools that require minimum participation, recommending that the simplest and most popular social media tools are more likely to be incorporated easily into courses. These positive perspectives about Twitter’s capabilities can be found in a systematic review, which was carried out by T. Smith and Lambert (2014), who found 14 studies showing that students have positive attitudes towards using Twitter in educational healthcare settings. Not only were students’ and researchers’ perspectives high regarding Twitter’s capability, but teachers also considered Twitter as a suitable tool for development. This is supported by Visser, Evering, and Barrett (2014), who revealed that teachers value Twitter as a method for professional development. Hence, these seem to provide a motivation for conducting

such a study. In addition, according to the outcomes revealed by the 12th annual digital learning tools survey in 2018, Twitter has been one of the top 10 tools for learning in the last 10 years among top 200 tools for learning (see appendix G). This result can be considered as a great indication for exploring Twitter more in learning environment.

When comparing Twitter with Learning Management Systems (LMS), according to Dunlap and Lowenthal (2009), it appears that even though LMS has tools that provide asynchronous discussion and synchronous chat, accessing these services takes more time. To use these tools on LMS for the purposes of engaging in discussions and collaborating and sharing material with other students, the requirement to log onto the system and work through several stages to navigate towards different locations, is a much longer process. Using the communication tools on systems such as LMS is often obligatory in educational institutions and is inconvenient in the context of day-to-day and hour-to-hour experiences. Communication among and between learners and faculty members is scheduled-based, which is also less flexible than using social networks such as Twitter, which promotes more autonomy. As a result, losing the opportunity of informal interaction and connection during the day is more likely to occur in systems such as LMS. An additional finding, based on students' reports, is that addressing student issues *via* Twitter is faster than LMS, particularly those issues or uses that are more time-sensitive (Dunlap & Lowenthal, 2009). Thus, this is an interesting concept that might encourage learners to engage in educational practice as using social media appears easier and faster than the official tools.

One of the major benefits of using social media is that it opens up education to the public, with academic content, discussions, and interactions becoming available to the wider world (Rodriguez, 2011). It would be interesting to report how undergraduates experience a social media platform such as Twitter, as applying the platform in an educational environment can be a challenge due to its nature. Twitter has a totally different platform to systems such as Blackboard, which students are used to. In addition, it would be interesting to highlight whether class members (students and instructors) connect with non-class members, or whether their connection is limited to selected members even though open tools are used.

Further points in relation to this will be discussed in more detail in the next chapter, which reviews the literature in more depth.

1.6.2 Geographic rationale

In 2015, a study assessing the growth of using social network sites among adults in the USA found that approximately two thirds of adults (65%) used social network sites, whereas in 2005, a mere 7% of adults used social networking. This result shows a huge increase in the use of social networks among American adults, which raises their importance in the life of humans (Perrin,

2015). Reflecting on Twitter as an example, eBizMBA (2015b) found that Twitter is one of the most popular social media networks in the world. This point is supported in Saudi Arabia, as Alwagait *et al.* (2014) found that Twitter is the most popular social media tool used by university students, with 90% of their study participants having a Twitter account. This popularity indicates that students spend time using this technology each day. Hence, exploring the integration of such a tool in the educational environment appears fundamental in Saudi Arabia.

Alim (2017) identified that sharing resources, posting important information, and asking questions are the top teaching activities used *via* Twitter in Saudi Arabia. The study relies on a small sample of around 60 academic staff members. It would be interesting to explore a wider sample size and investigate the concept from students' perspectives.

Further support is that, social media statistics in Saudi Arabia for 2018 revealed that 90.98% of entire population is active internet users and 75.19% of them is active in social media accounts. In addition, Twitter was recognised as one of the top active social media platforms in the country shown that 52% (17.29 million) of the population are active in Twitter (see appendix H). Thus, since Twitter has a high number of active users, it is important to report students' perspectives about this technology in terms of learning.

Again, further points in this regard will be explored and discussed further in the literature review in the next chapter.

1.6.3 Technology rationale

Twitter can be operated both on the Web and on an app, which makes it very convenient for students. This is supported by Badge, Johnson, Moseley, and Cann (2011), who found that Twitter is accessed on a range of devices and platforms, and that users do not rely on a single method all the time. Therefore, this enables users to have greater freedom and flexibility of access.

A further technical benefit is that, unlike some social media tools, losing data in Twitter is not very likely, as, unless the user removes their tweets, it will be saved and easily accessed. However, in WhatsApp, chatting data can be lost once the user deletes the application or loses their mobile account, unless the data is backed up on other devices or the iCloud. Other programs such as Snapchat do not retain any messages. All information and topics discussed in Twitter remain available and researchable at any time, due to the public record of tweets.

It is worth noting that research conducted in Saudi Arabia to measure students' attitudes and expectations towards mobile learning reveals that providing mobile learning leads to a perceived enhancement of learning and teaching methods (Al-Fahad, 2009). Moreover, the author of this

study found that mobile learning activities contribute to a further engagement of students in the learning process. This is a key indicator that demonstrates that mobile learning is not an entirely new concept for use in classes in Saudi Arabia, and so accessing social media (Twitter) *via* mobile devices might, therefore, be the next step. This view can be associated with a study conducted by Hüseyin Bicen (2014) who stated that users' perceptions towards utilising Twitter *via* mobile applications for educational purposes, such as course concepts, slides, and videos, were very positive. Consequently, it appears that the usage of Twitter in educational environments alongside mobile applications is already accepted by students in some places to a certain extent.

Furthermore, Twitter also has no restrictions on place or time. To support this, the Twitter usage patterns of undergraduate students was investigated, which discovered a variety of locations and means, including the fact that 34% of students used Twitter on their mobile phone, 30% at home, 20% in cafes/restaurants, and 3% in internet cafes (Huseyin Bicen & Cavus, 2012). Therefore, it can be concluded that most users rely on their mobile phones rather than regularly using the platform in particular areas or using certain machines; this is supported by A. Smith (2011), who discovered that 94% of people utilised Twitter *via* their mobiles. The current research is built on prior studies, which show three positive outcomes; first, using mobile technologies for learning is not entirely a new method; second, learners tend to have a positive attitude towards the use of social media in their education; third, the use of Twitter for learning *via* portable devices also appears positive.

1.6.4 Personal rationale

As a researcher I am also interested in the usage of social media, particularly Twitter, from a learning perspective. This interest was initiated by my own first use of Twitter for educational purposes (during my master courses). Thereafter, I built academic communities *via* Twitter based on my general interest (education) and my specific interest (education and technology). Through these communities, I realised there were several advantages, such as exchanging ideas, sharing information, and discussing related topics. Since then, I have valued the use of Twitter for such purposes and so I attempted to expand this interest into an empirical study. This may, of course, influence my decisions during the research process, so it is important for the reader to be aware of my interest in this field.

1.7 Research objectives and questions

In terms of presenting and organising the research objectives and questions, it is important to acknowledge that the order of these is affected by the results of exploratory factor analysis.

1.7.1 Research objectives

This research aims to explore the usefulness of social media (Twitter) in university students' learning environment in Saudi Arabia. An investigation of students' perceptions towards the integration of social media in their learning setting has been closely examined to achieve the following objectives:

- Provide detailed information focusing on the challenges that students experience through the integration of social media (Twitter) in the educational setting. This information is reported to assess both beneficial and detrimental aspects in respect to participants' responses, as well as how the Twitter tool is being utilised in a learning environment;
- Determine the obstacles faced by students through the integration of social media (Twitter) in their learning practice;
- Determine the disadvantages that students encounter through the integration of Twitter in a learning environment;
- Provide detailed information regarding Twitter's positive capacity in students' learning practice;
- Provide detailed information exploring students' engagement through social media for educational purposes; and
- Provide detailed information focusing on the possibility of Twitter offering pedagogical potential in their learning environment.

1.7.2 Research questions

- To what extent do students find challenges of integrating Twitter in a learning environment beneficial/detrimental and how?
- What are the perceived obstacles to integrating social media (Twitter) into educational disciplines?
- What are the perceived disadvantages of integrating Twitter into educational disciplines?
- To what extent do students believe that using Twitter has a positive capacity within their learning environment?
- To what extent do students engage *via* social media (Twitter) for educationally relevant purposes?
- To what extent do students believe that social media (Twitter) offers pedagogical potential in their learning environment?

1.7.3 Explanation the use of the word ‘challenge’

In this section the word ‘challenges’ will be given an explanation and definition according to its use in the whole thesis. It should be noted that the explanatory factor analysis was applied in the current thesis to identify the pattern of responses in the questionnaire. Consequently, the output of explanatory factor analysis produced six factors, each factor was given an appropriate name according to its items. The first factor had around 22 items reflecting various opportunities and affordances that students experienced during the use of social media in the learning environment. Thus, the appropriate and suitable word that reflects these items was the word ‘challenges’ (see Table 4.13). Consequently, the use of the word ‘challenges’ always referred to the first factor. This paragraph is written to provide the reader more information about the use of this word in the rest of the thesis.

Table 1.4: Research questions and used instruments

N	Research questions	Data sources
1	To what extent do students find challenges of integrating Twitter in a learning environment beneficial/detrimental and how?	Questionnaire Semi-structured interview
2	What are the perceived obstacles to integrating social media (Twitter) in educational disciplines?	Questionnaire Semi-structured interview
3	What are the perceived disadvantages of integrating Twitter into educational disciplines?	Questionnaire Semi-structured interview
4	To what extent do students perceive that using Twitter has a positive capacity within their learning environment?	Questionnaire Semi-structured interview
5	To what extent do students engage <i>via</i> social media (Twitter) for educationally relevant purposes?	Questionnaire Semi-structured interview
6	To what extent do students believe social media (Twitter) offers pedagogical potential in their learning environment?	Questionnaire Semi-structured interview

1.8 Outline of the thesis

The current thesis is built on six chapters, which are listed below:

Chapter 1 provides a background to the study including social media and social networks, the context of the study, research objectives and questions, and the rationale for choosing Twitter.

Chapter 2 provides a background in the relevant literature that has examined the use of social media in education with a focus on the use of Twitter in the learning environment. An overview of the literature approach is provided, including areas to explore and an analysis of related theoretical concepts. The structure of this chapter is influenced by the results of the exploratory factor analysis of the main study in terms of organisation and presentation. To illustrate this, and have a solid but straightforward thesis structure, the literature review is updated and re-organised according to the outcome of exploratory factor analysis. Importantly, this organisation also influences the structure and organisation of the research questions. Thus, the structure and organisation of the literature review, analysis, and discussion chapters are presented in a similar way.

Chapter 3 explains the methodological approach used in collecting quantitative and qualitative data, and justification for the rationale for the chosen mixed methods and instruments. Furthermore, the validity and reliability of the research instruments are discussed, followed by ethical considerations.

Chapter 4 presents the quantitative results of the study and the analysis of the questionnaire data. The chapter commences by analysing the demographic information of the participants and the procedure for conducting the exploratory factor analysis, followed by descriptive and inferential analysis and outcomes.

Chapter 5 presents the qualitative results of the study as well as the analysis of the data. The chapter commences by presenting the demographic information of the participants, the procedure of conducting the analysis of the qualitative data, followed by the outcomes of the semi-structured interviews.

Chapter 6 discusses the findings of the two previous chapters by providing a discussion according to the research questions and an exploration of them in the light of the research questions and existing literature.

Chapter 7 presents the conclusions of the findings and explaining the strengths and weaknesses of the research as well as the contributions of the study.

Chapter 2: Literature review

2.1 Introduction

The rapid growth of social media technologies over the last decade requires more attention from researchers to investigate the potential they offer to society. This growth has generated opportunities and risks, both for educational institutions and businesses (Tomayess *et al.*, 2015). There is rapidly growing literature on the use of social media, for example Twitter in relation to educationally relevant purposes, which indicates that this is a promising technology for education (Grosseck & Holotescu, 2008; Junco *et al.*, 2011; Poore, 2016). Implementing such new technology into educational areas is encouraged by Luckin *et al.* (2009), who consider the emerging opportunities from Web 2.0 as a suitable platform for people to connect and express themselves, recommending that teachers, students, and institutions may need to develop new ways of thinking, understanding and interacting *via* opportunities that are created by new systems and technologies. It is worth noting that cutting-edge technology not only provides new possibilities, but also brings challenges to the education discipline (Conole & Alevizou, 2010), for instance, in the way it shapes people's methods of communication, interaction, sharing, and learning (Al-Khalifa & Garcia, 2013; Bosch, 2009). However, Luckin *et al.* (2009) point out some critical aspects, that is, before implementing any new technology into educational areas, educators must be cautious not to assume that all the technology popular with students at home can be useful and directly exported for use in schools. In other words, educators need to consider popular activities and behaviours to determine how they may support education.

In terms of higher education, it has been identified that many universities attempt to directly employ social media to support teaching and other purposes (Conole & Alevizou, 2010). In this regards, Saudi universities are not exceptional; they use social media to support students for several academic purposes.

In this study, the main sources of data were derived from students' perspectives; students' views about social media appeared to be positive across a wide range of literature. For example, it was determined that bachelor's students agreed that social media in educational environments had a positive influence on students' academic performance (Oye, Adam, & Nor Zairah, 2012). However, some educators question the suitability of social media for learning. For instance, Friesen and Lowe (2012) argue that social networks are commercial tools and are merely designed to promote general debate, provoke disagreement, or enable conviviality. Thus, both facets are considered comprehensively in this chapter.

The outline of this chapter is as follows. Firstly, literature approach is presented, after which it is discussed the related demographic data. Then the background in the relevant literature will be examined along with an overview of related theoretical concepts.

2.2 Literature review approach

Producing a solid and relevant literature review is an essential task that requires some preparation. The current section presents the rationale and the procedure for the development of the literature review and will highlight the themes and keywords used to search for relevant literature. In addition, the sources for the search, the resources, and the online databases will be outlined.

To write a comprehensive literature review, it was necessary for me to develop my skills to enable me to produce an appropriate piece of academic writing in a language that was not my mother tongue. This development was achieved by reading and trying out ideas from a number of relevant books by Ridley (2012), Eales-Reynolds, Judge, McCreery, and Jones (2013), and Machi and McEvoy (2012). I also attended some related courses provided by Durham University (training courses), and took part in consultation and feedback during my supervisions.

The search for extant literature was conducted *via* several steps. First, it was necessary to identify issues and topics that were relevant to the research focus of the study. Second, I attempted to collect all the relevant key research words or terms used to refer to the research focus, such as Twitter, tweet, microblogging, social networking, social network, and social media. Third, I conducted a search for relevant articles, books, theses, or conference papers in a series of internet databases, as listed in Table 2.1. Furthermore, at this stage, a number of approaches were undertaken, such as previewing, selecting, and organising based on the advice of Machi and McEvoy (2012) (see Table 2.2).

Table 2.1: Databases that were used

N	Databases name
1	Google Scholar
2	Durham University Library
3	Newcastle University Library
4	Scopus
5	ResearchGate
6	ScienceDirect
7	British Journal of Educational Technology
8	Australasian Journal of Educational Technology
9	International Journal of Mobile and Blended Learning
10	Educational Technology & Society
11	IEEE Transactions on Learning Technologies
12	IEEE Transactions on Education
13	Saudi Digital Library (SDL)

Table 2.2: Search task

Stage	Search Task	Search approach
1	Literature preview	Scan
2	Content selection	Skim
3	Data organisation	Map

It is worth noting that the researcher excluded literature that focused more on language learning, as the current research is focused on Twitter as a source of knowledge and building communities within the same language speakers, rather than learning another language.

2.3 Demographic data

Many empirical studies attempt to provide simple general information. In this section, some demographic data are reported. Such information is important as it may increase the external validity of the study, particularly when there are a variety of people participating.

2.3.1 Familiarity with Twitter

Providing basic information related to the research sample produces wide knowledge about individuals' backgrounds and experiences. In the literature, analysis of the demographic data shows that the vast majority of students are familiar with Twitter. In one study, 84.6% of participants reported they have a Twitter account (Tur & Marín, 2015). Additionally, eBizMBA (2015b) found that Twitter is one of the most popular social media networks in the world. This point is supported by Saudi Arabia, as Alwagait *et al.* (2014) found that Twitter is the most popular social media tool used by university students, with 90% of the participants using a Twitter account during their study. Familiarity is important as it shows that students are more likely to be aware of the general use of Twitter, which may ease the use of Twitter in education.

2.3.2 Time

The literature measured and analysed the time people spend on Twitter. Huseyin Bicen and Cavus (2012) analysed their participants regarding the number of hours spent on Twitter per day, and reported that 40% used the platform for more than four hours a day, 30% used it for three hours a day, and only 11% used Twitter for an hour a day, or less. This time can be either positive (a reasonable amount of time) or negative (an excessive amount of time); the current study measured the time people spend on Twitter.

2.3.3 Age and frequent use

Demographic variables such as age and frequency were evaluated to determine how the use of social media might affect higher education scholars when they utilise it for personal, teaching, and professional reasons. This was carried out by Manca and Ranieri (2016), who discovered that age was significantly associated with Twitter usage, with people of ages ranging from 25 to 54 tending to use Twitter more than people aged over 55. According to the same investigation, the frequency of personal use is highly correlated with the frequency of professional use. However, this study was more focused on academic staff than students and was limited to Italian samples. Furthermore, it was reported that nearly 90% of students' access Twitter to perform academic activities once or more in a day (Tur & Marín, 2015). The current study measured the frequent use of Twitter in order to produce hypothesis.

2.3.4 Twitter functions and devices

Twitter has several functions that are utilised by users; some of these are more important or practiced from an educational perspective. A study revealed that the most common functions used by students were quotes, photos, and videos, followed by music, news, IT news, and magazine news (Huseyin Bicen & Cavus, 2012).

As Twitter can be accessed *via* more than a single machine, reporting these methods seems vital in providing more details about the research sample. A study reported the devices used to access Twitter, and revealed that 79% of students access Twitter through their tablets or mobile phones, whereas 59% of the participants access the platform *via* laptops (Tur & Marín, 2015).

To conclude, the current study is no different to earlier researches in the field; therefore, demographic data will be reported. The following section will discuss the main aspects of the current research. The instructions in this section are organised and categorised according to the results of factor analysis. Therefore, the names of the sections, the order and the focus are derived from exploratory factor analysis outcomes.

2.4 The challenges

Students' familiarity with, and the popularity of, Twitter has the potential for consideration as an instructional tool for teaching and learning. This section will discuss the challenges of the integration of Twitter into the learning environment. The content of this section is extensive, so the researcher has attempted to create subsections, including the place of activities, dissemination, communication, interaction and collaboration, Twitter is more useful than I thought, questions and answers, and understanding of an educational topic.

2.4.1 Place of activities

The unrestricted nature of activity locations appears important, as users can complete required tasks in a flexible and convenient way, rather than being limited to a specific place or time or simply relying on a learning management system such as Blackboard. Flexibility regarding location offers more possibilities in terms of accomplishing tasks more quickly and more easily. This section is divided into three sub-sections: activities before, within, and beyond class sessions. The division is created around the physical classroom. The three aspects of the question will be discussed individually and in depth.

2.4.1.1 Preparing activities before a class session

Twitter can be used as a tool that assists students in preparing classroom activities prior to coming to class. Alhomod and Shafi (2013) examine the benefits of Twitter when preparing for courses to gain knowledge about an educational topic before involvement in classroom discussions. The authors recognise that Twitter is an essential tool at this stage due to fact that Twitter allows students to communicate with teachers and other students in relation to specific topics before attending the session. Moreover, the author reports that learners are given the opportunity to accomplish required tasks in two ways; first, they individually master activities, then discussed them collaboratively with their classmates. This positive result may be seen as confirmation for an earlier investigation that was based on both quantitative and qualitative findings and suggested that Twitter facilitated accomplishing traditional educational objects (Rinaldo, Tapp, & Laverie, 2011). In this regard, it is worth addressing that students are required to be active on Twitter for such academic practices before attending class. This was reported by Pavlovic, Vugdelija, and Kojic (2015), who examined how often students are active on Twitter before coming to class to prepare for seminars. Their survey results demonstrate that students were active on Twitter from an hour a day to one hour per week. A related search was conducted in Spain by Tur and Marín (2015), who found that 88.9% of their participants gave positive responses to 'It has helped me a

lot in preparing the role I had to play during the face-to-face debate'. Activities prior to attending class are more likely to be maintained during and after class. It is assumed that 'preparing activities before a class session' is a starting point for most of the activities that follow. In addition, prior communication among learners before attending the class leads to establishing face-to-face communication more easily (Alhomod & Shafi, 2013). A related concept, based on thematic analysis and progress reports, is that students found it beneficial to use Twitter to receive assignment reminders (Lin, Hoffman, & Borengasser, 2013). Based on this, Twitter continually shows positive result in relation to activities prepared before class. Therefore, it is worth expanding this using a mixed-method approach along with reporting what types of facilities they have.

2.4.1.2 Activities in the classroom

Having considered practical and preparatory activities before coming into the classroom, this section looks at activities that take place in the classroom, through Twitter. Looking at classroom activity within large-lecture courses, Twitter is a generally facilitating tool that develops students' enthusiasm for, impressions of, and participation in the course (Elavsky, Mislan, & Elavsky, 2011). Similarly, Rinaldo *et al.* (2011) state that Twitter is a practical tool that fits into the classroom. It is also acknowledged that social networks, including Twitter, allow students to continually expose their ideas, engage in their creativity, and assist the generation of academic awareness among themselves (Roy & Chakraborty, 2015). Integrating a tool that has such facilities, along with motivation enhancement, appears significant in an educational setting. This is an important dimension of learning because students are more likely to learn well when they are motivated. In support, this concept motivation is recognised as an essential factor in psychology and education (Anderman & Dawson, 2011) and social media is found to be a tool that increases students' motivation (Poore, 2016). Tur and Marín (2015) emphasise that Twitter enhances learners' motivation to contribute to classroom discussions. They explore the positive correlation between the number of tweets during lecture time and the development of classroom interaction as a way of researching this idea. A similar study identifies that there is also a relationship between the number of tweets during scheduled lectures and how Twitter assists students to use course materials effectively (West *et al.*, 2015). This confirms questionnaire results reported by Jacquemin, Smelser, and Bernot (2014), who found that Twitter augments classroom content. In addition to these advantages, adopting Twitter in the classroom environment has the potential to develop students' participation (Elavsky *et al.*, 2011). To support this, *via* an experimental study, researchers discovered that Twitter appears to be an effective method to enhance students' memories for key classroom concepts (Blessing, Blessing, & Fleck, 2012). This confirms an older study, which revealed that students felt that microblogging tools

are more beneficial than typical blogs when writing quick reflections and thoughts, while typical blogs might be more beneficial for storing knowledge (Ebner & Schiefner, 2008). This approach is very important in the view that students do not necessarily have the same learning ability in a physical classroom, due to fact that some learners face issues with recall and learning, particularly those who have learning difficulties (Vera, Herrera, & Vived, 2005). Integrating such a tool would result in wider benefits.

Furthermore, within classroom activities, it is worth highlighting that the integration of Twitter can change the traditional class layout, as per this declaration by Dr Parry, which was quoted in Ferenstein (2010b): 'It was the single thing that changed classroom dynamics more than anything I've ever done in teaching'. Changing traditional organisation may alter classroom routines to be more participative. Similarly, Veelo (2009) acknowledged that using Twitter enabled classes to be more interactive.

Twitter can also be considered a 'backchannel' to support lectures (Grosseck & Holotescu, 2008); this links with another study, which reports that social media is an ideal means for supporting backchannel communication (Sutton, Palen, & Shklovski, 2008). A further reason for incorporating Twitter in learning areas is to encourage students to engage in classroom activities. Rankin (2009, p. 1) believes that the Twitter experiment was successful due to the fact that it encouraged disengaged learners to participate in classroom activities.

Twitter was examined for its use as an educational tool in the classroom by Markham and Belkasim (2011), who suggest that Twitter is not the ideal choice for social education, despite its use in creating and monitoring collaboration, irrespective of physical distance. Furthermore, there are some negative findings reported in relation to this technology, e.g. Twitter is seen as a difficult tool for classroom. This was reported by Osgerby and Rush (2015), who state the focus group results for engagement in the classroom demonstrated that 'Twitter is a bit too complicated for use in the classroom. It is being bent to do tasks which can be carried out using easier methods'. Meanwhile, within the same study, it was reported that 'Twitter in the classroom could be useful as you are able to get to know other students that you might not be able to talk to face to face'. This demonstrates individuals' differences in accepting and practising technology. Ultimately, instructors encouraging students to use Twitter for learning purposes is a vital element. This is also reported by Osgerby and Rush (2015), who found that 46% of the participants disclosed that they would have been more motivated to utilise Twitter if grades had been particularly awarded for that. Likewise, Lin *et al.* (2013), who reported students suggestions that Twitter activities have be integrated into lectures as a required task if it is to increase the participation of their peers. Based on the previous benefits of Twitter, this section is concluded with a statement by Pavlovic *et al.* (2015), 'Twitter is an effective tool in the classroom'. Thus, examining Twitter in more different classroom background, provides wider aspect of results.

2.4.1.3 Activities beyond class sessions

Educational activities can be limited to the physical classroom building, but introducing technology, such as social media, allows the extension of activities to be carried out after class sessions have ended. DeGroot, Young, and VanSlette (2015) report that instructors could use Twitter to extend the physical classroom. A related study based on in-depth interviews and observations from trainees, who received formative evaluation through Twitter after each lecture, highlighted the value of online formative evaluations for supplementing traditional classes and improving learning experiences (Chen & Chen, 2012). This can be associated with an investigation that suggests that Twitter hashtags are commonly applied in the classroom setting to expand ongoing discussions to beyond the classroom, or simply to raise a question (Ferenstein, 2010a, cited in McArthur & Bostedo-Conway, 2012). Similarly, microblogging is recognised as a novel form of extending collaboration beyond the classroom (Ebner *et al.*, 2010). Hence, these studies demonstrate the beneficial use of Twitter in this approach as it allows students more time to discuss the topic/concept further as well as opportunities to share more relative information. Twitter can be considered as a tool to extend and maintain face-to-face discussions that occur during and after class.

Ultimately, using Twitter beyond the classroom is not limited to sharing information and extending ongoing discussions; it can also be used as a tool to evaluate occurrences during lectures. To support this perspective, a practical use of Twitter is reported. Trainees were asked to evaluate their tutors after each lesson using the 'direct message' function to provide feedback. This was only visible between the students and instructors who posted them, and the overall experience was positive (Chen & Chen, 2012). Therefore, in this view, social media is likely to bring practical benefits to educational discipline, providing several educational approaches.

2.4.2 Dissemination

Social media networks, such as Twitter, are being used for the dissemination of classroom news and as a platform for delivering assignments, homework, and informing students about resources, as well as linking them to relevant material for their educational subject (Oye *et al.*, 2012). This confirms an earlier study conducted by Fox and Varadarajan (2011), who determined that 81% of participants insisted on the importance of Twitter in relation to sharing ideas amongst themselves and expressing their thoughts to the class, which otherwise could not be done. These findings are supported by Alim (2017), who identified that sharing resources and posting important information are the top teaching activities used *via* Twitter in Saudi Arabia. This facility does not seem to limit class members; when Twitter was examined as a learning tool, it was determined that Twitter enabled 93% of students to share their views with others from outside

their class (Becker & Bishop, 2016). Dissemination through social media is also reported as a convenient method by students. For example, a study evaluating students' comfort levels while using Twitter for delivering medical news, discovered that 36% of students were satisfied and felt these features were convenient (Camiel, Goldman-Levine, Kostka-Rokosz, & McCloskey, 2014). Prior findings seem to be consistent with other surveys, which indicates that most students, both undergraduates and graduates, viewed social media, including Twitter, as more convenient than traditional online tools such as Blackboard (Jacquemin *et al.*, 2014). Looking at this concept from a wider perspective, an interesting result based on cross country research shows that respondents in the US and in Spain highlighted the use of Twitter as an educational resource for sharing, reflecting, and commenting with peers. Nonetheless, the differences in Twitter use between the two universities indicated that the respondents from Spain highlighted the importance of up-to-date information, while Americans placed more weight on the importance of Twitter chats (Tur, Marín, & Carpenter, 2017). This outcome indicates that Twitter was valued by students from both universities; however, their values were different in relation to Twitter's most useful aspects. This emphasises the importance of studying Twitter from the perspectives of different countries or cultures.

2.4.3 Communication

A number of studies highlight the effectiveness of Twitter in communication. People use Twitter to communicate with each other daily, asking for information, assistance, advice, and directions (Alhomod & Shafi, 2013). Linking this with early research Java *et al.* (2007) revealed three key categories of Twitter clients: information sources, friends and information seekers. Communicating with friends, instructors, and others is a key practical use of Twitter. It can be argued that even though Twitter is non-academic tool, its potential in academic areas should not be neglected. Research conducted to evaluate the benefits of incorporating technological tools particularly designed for education and tools designed for other purposes exposed that students use non-academic technological tools for communication in academic aspects (List & Bryant, 2008). This may indicate that students do not adhere to official tools provided by a university as they are more likely to apply technology they are more used to. Hence, it seems worth exploring the incorporation of Twitter for communication in the educational setting.

From an educational perspective, Poore (2016) states that integrating social media in educational disciplines contributes to a wide range of opportunities, such as communication. An investigation based on a focus group study revealed that students found that social networks are useful tools for communicating with friends from their school (Luckin *et al.*, 2009). Meeting with others face-to-face can be difficult in some cases; therefore, social media eases communication and passing information to others. A related descriptive study revealed that social media, including Twitter,

provides opportunities for students to communicate with peers whom they find it difficult to meet (Roy & Chakraborty, 2015). This is also agreed by Dhir, Buragga, and Boreqqah (2013), Ebner *et al.* (2010), and Junco *et al.* (2011), who state that Twitter is an important intrinsic platform that leads users to practise effective communication with classmates and exchange content amongst individuals. This is supported by Oye *et al.* (2012), who found that students use Twitter to generate educational discussions with peers and chat with classmates in relation to their educational interests. This is confirmed by Bledsoe, Harmeyer, and Wu (2014), who state that participants highlighted the main benefit of Twitter was the communication between class members. A further advantage of this tool is highlighted by Pavlovic *et al.* (2015), who assert that continuing communication between students and instructors beyond working hours is a remarkable advantage of social media; the research also reported students' experiences after integrating Twitter in teaching and learning. Most of them agreed that social networks enhanced their communication with the instructor.

Communication *via* Twitter among students or with instructors may extend to others. For instance, Oye *et al.* (2012), through their investigation in FSKSM (Faculty of computer Science and Information systems), determined that students use social networks for three kinds of academic reasons: communicating with supervisors and lecturers, communicating with the university, and communicating with other faculty members.

During educational practice, communication with others on Twitter is not limited to sending others private or public messages; students can also communicate *via* the reply function to provide feedback and responses to what happens on a course. This was illustrated by Ebner *et al.* (2010), who report how students and instructors use 'reply' on Twitter to communicate with each other. Therefore, it must be stated that communication with others in relation to education facilitated by Twitter, is not limited to one function.

2.4.4 Interaction and collaboration

Social media is seen as a method to enhance online interaction (McNeill *et al.*, 2016). Research produced by Moore (1989) labelled three types of interactions in distance education: learner-content interaction, learner-learner interaction, and learner- instructor interaction. Using Twitter for these types of interactions was examined by Prestridge (2014), who found that the majority of interactions occurred in the learner-instructor type, e.g. students tweeting a question and lecturers responding. In this kind of interaction, the learner initiated the dialogue with the lecturer's guidance and support. However, learner-learner interaction was not reinforced by Twitter, as the interaction comprised of students reading tweets but not actively interacting with them. In the

interaction between the learner and content, paraphrasing was a common procedure, whereby students tweeted course content.

Facilitating interactions is an important factor in learning as it may result in more effective learning and is an aspect that has been evaluated in a number of research studies. For example, one study examined Twitter as a learning tool, and showed that it enabled 93% of students to interact with others from outside their class for aspects of learning aspects (Becker & Bishop, 2016). Several learning management systems, such as Blackboard and Moodle, provide a number of tools for interaction. Nevertheless, Twitter differs from these because it enables users to comment, interact, and participate in real time, which is almost akin to a live conversation (Dunlap & Lowenthal, 2009). An early study conducted by List and Bryant (2008) agreed that Twitter is a successful tool for academic and social interaction and peer tutoring. Similarly, evaluating interaction was found in a recent study conducted by West *et al.* (2015), who discovered a positive relationship between Twitter-enhanced classroom interaction and the number of tweets posted during lecture times; another positive relationship was also found between learning materials effectively shared *via* Twitter and the number of tweets generated during lecture times. Learners interacting with others for learning purposes leads to another study finding, which is that students value the social learning experience, enhanced by social networks (Veletsianos & Navarrete, 2012).

Fox and Varadarajan (2011) evaluated Twitter interactions in relation to learner-content; the majority of students' tweets were questions or comments about the content of the day's session. Furthermore, authors also evaluated learner-interface interaction, showing that most of the students were comfortable with Twitter and learning. Moreover, vicarious interaction 'consistently occurred when students read other students' tweets'. However, learners were not interested in validating the source of information in terms of how they mastered something about the course, whether from guests or from instructor tweets (Fox & Varadarajan, 2011, p. 6).

A study conducted by Stevens (2008) evaluated the usefulness of Twitter in enhancing teacher-student interactions, in which it was discovered that Twitter enables learners to interact with their instructors and gain prompt feedback, which is rarely achieved in large, traditional classes. Fox and Varadarajan (2011) evaluated Twitter interactions in relation to learner-instructors; it was revealed that the interaction infrequently occurred when students initiated interaction with guests and the instructor. Nevertheless, it frequently occurred when guests and the instructor initiated the interaction with students, with the interaction among students represented by 1 in 5 student tweets. This result would indicate that encouraging interaction between students or others requires motivation by the instructor. Similarly, Prestidge (2013) analysed students' interactions qualitatively, finding that students initiated tweets based on their needs and interests, after which they obtained support and help, which was extended by the instructor. Interaction with the course

content was found; for instance, the students paraphrased the main points of lectures, showing that they could construct knowledge and understand the course through paraphrasing course content.

Collaboration can be achieved through the integration of Twitter. One survey reported that there are four main kinds of learners in social networks: researchers, collaborators, producers, and publishers (Luckin *et al.*, 2009). This indication increases the potential of Twitter for approaching collaboration and social media to be also seen by users as a collaborative tool. To support, Oye *et al.* (2012) found that social networks support collaboration in several ways, such as students collaborating among themselves and with their instructors. Likewise, in accordance with survey results, this kind of microblogging is a potentially helpful tool for collaboration beyond the classroom (Ebner *et al.*, 2010). In a similar study, based on a quantitative approach conducted by W. M. Al-rahmi, Othman, and Musa (2014), students' experiences and the impact of social media in academic performance through collaborative learning indicates that social media facilitates collaborative learning in the majority of learners. This is associated with findings that show that social media supports collaborative learning; thereafter, it leads to an enhancement in the academic performance of learners (W. M. Al-Rahmi, Othman, & Yusuf, 2015). This was also evidenced by Marr and DeWaele (2015), who evaluated Twitter in sport management classes, indicating that Twitter is an effective tool that encourages collaboration and further learning. In contrast, not all studies reported positive outcomes related to collaboration *via* Twitter. For instance, Lin *et al.* (2013) reported that collaboration did not occur when the use of Twitter was left to the learners.

2.4.5 Questioning and answering

Questioning and answering seems one of the most common practices of utilising Twitter in educational discipline. Questioning and answering were identified as one of the main tweet activities created by students during lectures and tutorials (Pate, 2015). Similarly, it was revealed that one of the top teaching activities used *via* Twitter in Saudi Arabia, was enabling students to ask questions (Alim, 2017). Based on students' perceptions about the use of Twitter in their study, they reported that asking questions and receiving answers *via* Twitter was helpful throughout their study. This benefit also increased their access to the instructor through posting enquiries and receiving responses (Gonzalez & Gadbury-Amyot, 2016). These findings are linked with West *et al.* (2015), who reported that students appreciate the value of Twitter as it allows them to establish a connection with their professor so they can easily ask a question *via* Twitter. It appears that during the implementation of Twitter in the classroom, students fulfilled their questions by asking and gaining responses, which indicates that Twitter is a facilitating tool for learners. To emphasis this notion, Junco *et al.* (2011, p. 130) concluded their study by stating social media can be applied

as an educational tool to aid learners in reaching their desired college outcomes. From this, it can be deduced that Twitter is definitely an excellent tool for responding to students' questions concerning assignment deadlines (Neal, 2012). A further study reported different outcomes during the integration of Twitter into the learning environment. This was evaluated by Knight and Kaye (2014), who found that students asked questions of specific users who were not their tutors, which may mean that participants used Twitter for course-related activities rather than for the courses themselves. This led Knight and Kaye (2014) to agree that Twitter could be considered as a community interest rather than a practise interest.

2.4.6 Understanding

Understanding the educational topic is the core of the learning process. A study conducted by Tur and Marín (2015) reveals that Twitter helps students gain a deeper understanding of the educational topic; almost 80% of the participants in one study reported that debates on Twitter help them to achieve a deeper understand of the topic. In addition, the availability of debates on Twitter can help deepen understanding for students, and instructors can have a positive role in motivating students to reach deeper learning; they state that informal explanation through social network sites produces direct opportunities for students to enrich their experience about learning a subject (Yang, Crook, & O'Malley, 2014). In contrast, Zainal and Deni (2015) conclude that even though integrating Twitter in education as a learning tool offers support for students, it did not extend students' learning about a course's topic. According to the author this may be caused by the nature of the course, students' preferences, inadequate infrastructure, and positive feelings towards using it.

To summarise, Twitter help learners gain more understanding in relation to educational topics; exploring this from a different sample background would be interesting.

2.4.7 Twitter is more useful than I thought

Believing in Twitter as a learning medium can be different among individuals. According to Lowe and Laffey (2011) users who are unfamiliar with Twitter as a social media tool, may doubt its potential and usefulness in the classroom discipline. Likewise, Twitter's usefulness may not always be obvious to beginner users until they have practised these tools (Chamberlin & Lehmann, 2011). Failing to recognise the value of Twitter as a professional tool for learning and educational communication and not immediately realising its power were issues reported by some educators; it took educators a while to understand the power of Twitter in an educational setting (Chamberlin & Lehmann, 2011).

Several studies also reported students' views after experiencing Twitter in their learning discipline. For example, a study reported students' experiences after integrating Twitter into undergraduate educational courses, finding that, not only had students' views and thoughts changed after completing the courses, but they also articulated several advantages, such as feeling engaged with the course content (Preston, Jakubiec, Jones, & Earl, 2015). In addition, it was found that after learning tasks were completed *via* Twitter, nearly 60% of students planned to maintain utilising Twitter as a personal learning network (PLN) (Camiel *et al.*, 2014); this is supported by Osgerby and Rush (2015, p. 345), who refer to student responses in focus groups: 'Since I did not use Twitter before, I was hardly interested in using it, but as I got along I did find it quite helpful'. To support this, students' perspectives were also reported by Tur and Marín (2015) as most agreed to use Twitter for learning even after completing the study. Interestingly, more than half of the participants decided to continue using Twitter for both personal and educational purposes. This can be linked with an investigation by Bista (2015), who revealed that some respondents were amazed by their presence on Twitter after implementing it in their classes. Initially, they thought it would be complicated to sign up for the Twitter course and felt uncomfortable completing the required tasks *via* Twitter. However, the study focused on graduate students, while the current research investigates undergraduates. Together, these studies indicate that some students may not initially appreciate, or consider, social media as a learning tool. However, since the views of students towards Twitter altered after completing the tasks, perhaps this is a good indication that students felt that they experienced positive learning *via* Twitter. The changes in individuals' thoughts, before and after using Twitter, are a possible indication that students found this technology to be a useful tool and for leaning *via* Twitter. In this regard, learning means a change in belief, knowledge, or attitude (Ambrose, Bridges, DiPietro, Lovett, & Norman, 2010). Hence, the changes in individuals' perspectives and understanding are viewed as a result of learning. A further indication is that, while integrating Twitter into classroom, it is possible to build a learning community within the purposes of learning. This may lead some students to plan continuing using Twitter for learning purposes with those members.

Looking at this phenomenon from a different perspective for wider understanding, Parry (2008) reports that at the commencement of his research, several instructors were hesitant in applying Twitter to daily teaching. Conversely, afterwards they appreciated the effectiveness of Twitter as a classroom tool due to the fact that it alters traditional classroom concepts.

2.4.8 Learning

Following the previous sections, learning is the target of all individuals and can occur using various methods. One of these methods is learning *via* social media. Therefore, it is significant to find out whether any learning transpired, based on students' perceptions. Junco and Cole-Avent

(2008), Junco *et al.* (2011), and West *et al.* (2015) advocate that social media in education enhances student learning and has a positive impact on the learning environment. Schroeder, Minocha, and Schneider (2010) report that Twitter contributes to more informal communication, which results in improving the quality of the program. Similarly, Ebner *et al.* (2010) determined Twitter to be an entirely new form of communication that supports informal learning beyond the classroom. Indeed, informal communication between learners and instructors is a significant factor in the overall learning experience. To support Twitter potential in learning, a study conducted by Osgerby and Rush (2015) found that 40% of respondents admitted that Twitter had the potential to assist them in learning. The potential that social media conveys for learning are varied. For instance, Twitter is preferable tool for learning; a study conducted in this regard showed that even though Facebook was more popular among students, Twitter was chosen by students for teaching and learning purposes, and, to illustrate their views, students felt that Twitter was more professional, while Facebook was a network for entertainment (Pavlovic *et al.*, 2015). This indication emphasises the potential value of Twitter among learners as a teaching tool.

In contrast, Lackovic, Kerry, Lowe, and Lowe (2017) conclude that students' application of Twitter for social purposes was low, and the vast majority did not use Twitter for learning purposes. Moreover, Zainal and Deni (2015) conclude that even though integrating Twitter in education as a learning tool offers support for students, it does not extend students' learning about a course topic. In addition, some researchers analysing Twitter activity exposed a large number of incorrect answers when students were tweeting. This negative finding could suggest that students do not consider Twitter activities to be serious tasks. In the same study, participants were asked to favour three student tweets based on the accuracy of responses to questions; the results revealed that participants favoured each other's tweets to gain mutual benefits rather than favouring the correct and accurate answers (Olive, Samper, Cuadros, Martori, & Serrano, 2015).

2.4.8.1 Visibility of tweets to others

The nature of Twitter is different to LMS in that responding to particular tasks can be viewed by others. This can be both a negative and positive experience. A reported research states that the visibility of textual work from others through Twitter is helpful. For instance, Osgerby and Rush (2015, p. 346) quote students' responses in focus groups. e.g. 'using Twitter is helpful because I can see other students' opinions and the way they solved the question' and 'Twitter was useful to compare my answer with the other answers posted by students'. This privilege can be criticised, as Twitter may reduce the efforts made by some learners, who may copy the ideas and efforts of others (Osgerby & Rush, 2015).

Some would argue that this method encourages less effort from some learners as they might

depend on others rather than seeking additional information for themselves. In this regard, it is vital to note that paraphrasing of other tweets is seen as a valuable learning strategy. Looking at other work requires paraphrasing, which is identified as a learning strategy under the elaboration learning strategies type (Weinstein & Mayer, 1983). According to Weinstein, Acee, and Jung (2011) paraphrasing and summarising has, at least, some level of processing and understanding, rewriting of information or ideas and writing style, which requires some cognitive processing.

2.4.8.2 Informal and formal learning

Even though the focus of this research is not about assessing social media in terms of informal and formal learning, it is worth drawing the reader's attention to Twitter's affordance in terms of literature. However, the current research will focus more on the use of Twitter from a learning perspective.

Applying social media in educationally relevant contexts has led some researchers to evaluate informal and formal learning in academia. It is reported that integrating social media into education provides an opportunity for learners to use informal exploration to improve their experience of learning, rather than extending formal classes to an informal online setting. However, it must be noted that the social media platforms used in the study by Yang *et al.* (2014) were Ning and Facebook. Ebner *et al.* (2010) state that microblogging has important potential for informal learning through communication between students regarding educational topics, and concludes that students learn informally *via* microblogging. A recent study shows moderately positive expectations related to Twitter as a teaching and learning tool by acknowledging that Twitter is a wonderful tool that closes the gap between formal and informal learning (Adams, Raes, Montrieux, & Schellens, 2018). Nevertheless, although Twitter increased students' exposure to a topic not found in text books, students found that social media was inappropriate for formal interaction (Jacquemin *et al.*, 2014). Therefore, social media tools could be more valuable in informal rather than formal settings due to the nature of social media. Moreover, it would be correct to state that obtaining further educational benefits by integrating social media into the learning atmosphere depends on the ability of the instructor, its level of integration, and the tool itself. In addition, an experiment designed for evaluating Twitter as an informal tool for outside the classroom demonstrated its pros and cons in comparison to traditional lectures. Twitter has the potential to promote 'the combined knowledge creation of a group better than individuals' diaries and discussion' (Kassens-Noor, 2012, p. 19) due to the fact that it facilitates the distribution of ideas beyond the limitations of classroom time and increases access to ongoing online discussions. Nonetheless, the drawback is the constraining self-reflection and critical thinking due to limited tweet characters (Kassens-Noor, 2012, p. 19). However, it should be noted

that Twitter recently doubled the characters in a single tweet, which may lead users to express themselves more widely.

2.4.8.3 The nature of tweets

This section provides an overview related to the nature of tweets and how they influence factors. It can be argued that students' experience and familiarity with social media contributes to the nature of tweets. For instance, a study conducted by Rinaldo *et al.* (2011), who analysed the content of tweets for two semesters with the same participants, discovered that, during the first semester, approximately 48% of tweets were personal in nature, whereas, about 19% of tweets were about the courses. It is worth noting that 17 students out of the 146 had no experience of Twitter beforehand. Nevertheless, during the second semester the participants appeared to write different types of tweets compared to the previous semester. For instance, the number of personal tweets decreased to 25%, whereas the number of course related tweets increased to 50%. However, it must be noted that students in the second semester were given a presentation on how to use Twitter, which could explain the difference in the content of tweets between the two semesters. This could indicate that maximising the benefits of Twitter can be achieved by preparing learners on how to use the technology in a certain way before actually using the technology itself. Therefore, the current study attempts to report whether there any differences in Twitter use according to demographic data (prior academic Twitter use and prior fully online course experience) *via* inferential analysis.

2.4.9 Areas to explore

Social media is known as an advanced technology and commonly used for social practices, which could lead us to acknowledge that such these technologies have a powerful capacity to be used in education.

As mentioned above, integrating social media, such as Twitter, into an educational environment seems challenging with regard to various aspects. Referring to the literature leads us to suppose that the challenges of integrating Twitter are largely experienced positively by students, indicating that the use of Twitter has the potential to offer several benefits to the learning environment. These benefits fluctuate in proportion amongst researches, which could indicate that there are factors influencing overall practice before the findings. These factors are not yet clarified, so it can be assumed that the popularity of particular social media, such as Twitter or YouTube, owning devices, having access to the internet, or students' perceptions towards the use of social media in education may differ from one country to another, which may produce fluctuate results. It is

believed that the nature of materials and the ages of students could affect the usefulness/effectiveness of Twitter in education. In addition, the nature of social media, including Twitter, differs from learning management systems, email or other type of social media platform. For instance, students accomplish activities, communicate, interact, collaborate, and question *via* Twitter, in a different way to official tools or other sort of technology such as Facebook. Individuals' differences may be noticed when practising these aspects, as well as the differences in language which is used for communication. These challenges may depend on research samples, conducted methodologies, educational goals, types of social media tools, and the process of implementation.

The current research attempts to explore the challenges that are experienced during the integration of Twitter in an educational environment in Saudi Arabia, based on students' perspectives. These challenges will be explored in terms of:

- Place of activities;
- Dissemination;
- Communication;
- Interaction and collaboration;
- Questions and answers;
- Understanding;
- Twitter being more useful than I thought;
- Learning; and
- Visibility of tweets to others.

The results have the potential to contribute to the wide knowledge of social media in education in general and in Saudi Arabia, in particular. These outcomes will be presented in the analysis chapter and deliberated within the discussion chapter.

2.5 Obstacles and disadvantages of Twitter

Within this section, there are two separate factors, namely, the obstacles and disadvantages of Twitter. These factors address the negative facets of Twitter that might reduce the efficiency of such tools in the learning environment. These are key barriers that were previously identified in the literature.

Despite the benefits of social media in education, risks and harms might exist when using this tool (McNeill *et al.*, 2016). Alim (2017) and Goldfarb, Pregibon, Shrem, and Zyko (2011) raise some concerns related to the incorporation of social media into higher education, one of which is ‘privacy’; this appears to be a major hindrance, which bars educators from integrating social media in the classroom and students from utilising these tools within their learning environment. This is consistent with the concerns of Al-Khalifa and Garcia (2013), who discovered that sharing and exposing personal information when integrating social media in higher education is a fundamental barrier. Likewise, Roy and Chakraborty (2015) recognise the same issues, finding roughly three quarters of their participants are worried about privacy on social networks. However, the study was limited to a small number of participants in one country (Bangladesh), so this result cannot be generalised. Exposing personal information to the public *via* technology enables other users such as hackers to track or use other people’s information for personal gain (Al-Khalifa & Garcia, 2013). Interestingly, some appear cautious about their privacy, for instance, it was reported that users consider privacy while uploading photos or videos as this leads to criminal activities (Roy & Chakraborty, 2015). Hence, privacy is a crucial aspect that requires additional consideration regarding the use of social media in both personal and academic life.

On the other hand, Fox and Varadarajan (2011) report that most students (90% of 131 participants) were not concerned about their privacy when applying Twitter in their study. This can be associated with the findings reported by Lin *et al.* (2013), which reveals that participants did not particularly raise issues of privacy when using Twitter within the learning environment, whereas, two participants recommended having two separate accounts, i.e. one for personal tweets and another to use for class requirements. This is in line with suggestions provided for instructors by Goldfarb *et al.* (2011), who state that educators need to create two separate accounts: a personal account and a professional account. Based upon earlier study, it appears that the level of privacy and the way that users relate to Twitter differs among users, and the possible explanation may not be clear at this point.

There are also growing concerns that using social media might have some negative effects on students’ studies (Huseyin Bicen & Cavus, 2012; T. Smith & Lambert, 2014). This section highlights several obstacles identified in the literature. The use of social media may adversely influence students’ grammar. To support this claim, Roy and Chakraborty (2015) carried out a descriptive survey, which revealed that the level of correctly written grammar among learners

decreased because of the incomplete sentences. Similarly, in a systematic review carried out by T. Smith and Lambert (2014) on the successful implementation of Twitter, it was revealed that there is concern related to the conflict between its social and academic use, privacy and anonymity, technological knowledge, time management, and Twitter character restriction. However, a prior study examined both Facebook and Twitter in healthcare higher education practice. This could cause an overlap in the outcome of the use of both tools.

Exploring a further point, a study conducted at The University of New Hampshire in 2010, cited by Huseyin Bicen and Cavus (2012), concluded that the majority of students' involvement and participation in Twitter is limited to entertainment purposes. Another shortcoming was reported in a research conducted to evaluate the impact of social media on education in Pakistan, where it revealed a negative aspect of social media in education due to students being distracted from their learning, wasting time, and students using it for non-educational purposes (Tariq, Mehboob, Asf, & Khan, 2012). However, this paper did not provide empirical evidence and was based on the authors' views. Consequently, mentioning such views provides the researcher with extended negative expectations regarding social media. It is consistent with the study by Osgerby and Rush (2015), who state that, generally, students are inclined to dislike the integration of social activities with academic practice. Furthermore, Twitter is seen as a platform to further one's career, and is a concern highlighted by Lackovic *et al.* (2017, p. 45), who state that Twitter is seen as an employability channel; this might imply that it is unlikely to be viewed as school curriculum so it is not understood as a learning method. Therefore, these concerns should be considered when implementing social media into education. However, these issues might differ from time to time, from one country to another, or from simple individuals' expectations.

A further concern is that applying social media in learning and teaching may result in distracting students during their study time. To illustrate this, students found chatting with their relatives and friends for non-academic and social purposes through social media during lecture times when they should be concentrating on studying (Oye *et al.*, 2012). This study also highlights that, unlike postgraduate students, undergraduates essentially use social networks for socialising. However, the study applied a proposed model to assess the influence of most social networks such as MySpace, Facebook, Orkut, and Twitter Friendster on academic performance, rather than focusing on a single tool and apply it for learning. This is associated with earlier research, which found that nearly 71% of students reported that Twitter distracted them from course discussion and 69% stated that Twitter hindered them from taking notes as thoroughly as they desired (Fox & Varadarajan, 2011). However, the authors of the study did not clarify specifically what the cause of the distraction was; it may have been technical issues or other causes. Moreover, it is possible to claim that students were not given sufficient time during class and, as a result, they did not take notes appropriately.

On the other hand, many studies show the potential value of social media in both academic and non-academic use. For instance, Tur *et al.* (2017) found that the majority of participants in US and Spain used Twitter for both academic and personal purposes, showing that the positive learning experiences exist among learners. Similarly, Badge *et al.* (2011) found that Twitter supports peer-to-peer possibilities for both academic and/or social aspects, suggesting that learners are willing to utilise novel means, such as Twitter, in sophisticated ways to enhance their education. This is reinforced by an investigation conducted by Osgerby and Rush (2015), who found that approximately 40% of respondents applied Twitter to help their social lives, whereas 25% only used Twitter to communicate with other students. Badge *et al.* (2011, p. 6) state that 'Twitter is a popular social tool while retaining the ability to be a useful academic tool'. Therefore, it can be seen that social media is already part of students' academic lives although the frequency of this practice in academic life may fluctuate among users. Students are capable of distinguishing between communication with academic staff and their peers (Badge *et al.*, 2011). The authors concede that, during the use of non-academic control channels, students appear in highly sophisticated manner so there is no harm or resentment. The use of Twitter among students was investigated by Knight and Kaye (2014), who conducted a survey to explore the undergraduate use of Twitter. They discovered users adopting Twitter for different purposes; for instance, undergraduates used Twitter more for personal reasons, enhancing pre-existing relationships and interacting with their local communities. Their participation in a wider community was limited to followers, readers and retweeters, suggesting that, although Twitter is an open online platform, some users limit their use of Twitter to their known friends.

Further drawbacks related to Twitter in education include the illogical organisation of tweets, information, and questions and answers. Thus, even though Twitter provides wide access to a variety of information, five master's art students out of 62 felt overwhelmed by the massive amounts of information (Bledsoe *et al.*, 2014). These remarkable factors could lead to an increase or decrease in the success of Twitter in education. A study revealed that, among a large quantity of tweets, many tweets are not related to the class's content (Lin *et al.*, 2013). Further related issues include miscommunication and information overload, which are considered as obstacles when integrating social media in higher education classes (Al-Khalifa & Garcia, 2013; Reuben, 2008). In addition, Luo and Dani (2015) discovered that students could easily post and provide feedback on Twitter; however, they sometimes struggled to locate and retrieve posts and feedback afterwards. This could indicate that integrating Twitter needs to adjust certain methods to be more appropriate for educational practice. For example, tweeting in an appropriate hashtag helps users to locate all the tweets they post and require in particular virtual categories. Moreover, issues such as this emphasise the importance of providing introductions and instructions regarding the use of the technology before actually applying it.

Access difficulties are another issue related to Twitter and learning; despite the benefits of social media in extending learning beyond classroom hours, this is only true for those who have access to internet and technology devices at home (Goldfarb *et al.*, 2011). These limitations were identified in the literature. For instance, not owning a smartphone and having no internet connections are seen barriers to implementing social media, especially for learning. Related research conducted by Lackovic *et al.* (2017) showed that six respondents out of 43 did not have smartphones, which hindered their access to Twitter, identifying this as an obstacle related to technology. Alim (2017) revealed several negative experiences of using Twitter in teaching activities, one of which was the internet connection.

Addiction to and spending excessive time on social media are seen as additional drawbacks for social networks (Roy & Chakraborty, 2015), and may, therefore, negatively affect students' performance, highlighting the influence of the typical use of social networks on education. Likewise, research conducted on university students, particularly in business departments, revealed that there was a significant adverse statistical relationship between time spent on social networks and their academic performance (Paul, Baker, & Cochran, 2012). This can be associated with the outcomes of Oye *et al.* (2012), which determined that students planned to use social networks for a few minutes then found themselves spending hours on it, which negatively affected their grades. Prior studies focused on academic performance, using several types of social networks in general, rather than incorporating and measuring a particular tool within the learning environment.

On the other hand, Ozer, Karpinski, and Kirschner (2014) found that using social networks has no influence on student grades. Likewise, Alwagait *et al.* (2014) conducted a survey with university students in Saudi Arabia regarding whether the increase in social media usage reduces the academic performance of students or not; their results demonstrated that there was no linear relationship between the amount of social media usage in a week and their GPA. In the same study, some participants importantly highlight that, during the use of social media, time management was a fundamental factor that could affect students' studies negatively, if not well managed. Thus, managing time on social network sites appears necessary to prevent a downfall in academic performance. Consistent with the previous two authors, a cross-culture qualitative research conducted in the US and in Europe revealed that most respondents have the common view that using social networks does not affect their grades (Ozer *et al.*, 2014).

Lack of encouragement seems to be a barrier in educational activities and successful technology integration. For instance, incorporating Twitter into learning environments can be limited to course-related content and graded activities rather than social networking and sharing. In other words, students did not engage in activities with each other except those required for course credit or by motivated by instructor (Veletsianos & Navarrete, 2012). The argument for this can be that

Twitter activities related to learning and teaching are like any educational activity; a lack of encouragement and enforcement may result in a lack of participation. Social media can be seen as an encouraging tool that provides learners with opportunities to participate and engage in discussions. Social media can be described as a virtual place for students who do not often speak in front of others; they may feel more freedom to participate and communicate using such a tool (Roy & Chakraborty, 2015). Likewise, learners highlighted the power of Twitter in allowing them to anonymously express their opinions (Fox & Varadarajan, 2011).

It is worth noting that Twitter is not specifically designed as an educational technology for use in the classroom. Therefore, instructors need to provide additional instructional techniques and strategies to compensate for difficulties that arise when it is applied to the learning environment (Luo & Dani, 2015). Providing particular methods and techniques will increase students' motivation and support the successful integration of the technology.

2.5.1 Areas to explore

From the preceding discussion, it appears that social media, like any other technological tools, has positive and negative potential within an educational environment. Adverse aspects of social media, including Twitter, can cause unstable results in education. Upon further inspection of previous literature, several difficulties were identified; obstacles encountered by individuals when social media is integrated into the learning environment can vary, as can the culture of different technologies. Therefore, it would be interesting to discover the barriers encountered by undergraduate students in Saudi Arabia and identify obstacles to highlight common and unique hindrances. Although a couple of studies have revealed some issues related to the use of social media in education in Saudi Arabia, none report these barriers after integrating social media in the learning environment; merely educators' or students' attitudes are reported. It would be interesting to determine Twitter's barriers to learning based on students' perceptions after their usage of Twitter in learning environment.

2.6 Disadvantages of Twitter

This section will focus more on the disadvantages of using Twitter in the learning environment. It should be noted that this section is more about Twitter itself, rather than social media practices, which were discussed earlier in the obstacles section. To evaluate the positive capacity of Twitter, it is worth assessing the disadvantages of this tool in education. Twitter has some drawbacks that reduce its possibilities in education.

Social media can be a distraction during learning (Oye *et al.*, 2012). An investigation carried out to evaluate Twitter revealed that the tool is a distraction, hindering learning; interviewees reported that Twitter interrupted their concentration. In another study, nearly 71% of students stated that Twitter distracted them from course discussion and 69% reported that Twitter hindered their note taking, which was not as thorough as desired (Fox & Varadarajan, 2011). However, the authors did not clarify specifically what the cause of distraction was, so it may have been technical issues or other causes. Moreover, it is possible to claim that students were not given sufficient time during class and as a result, they did not take an appropriate amount of notes.

Research conducted by Tur and Marín (2015) reveals a positive view of Twitter in the learning environment; only 1.89% of their participants reported that Twitter inhibited them from participating in a debate. During the same prior study, only 16.98% responses from 54 participants reported that Twitter did not help them understand the topic and argument in a debate. In addition, approximately 3.77% of 54 participants found debating on Twitter had caused more confusion than understanding, whereas most students did not find it confusing.

2.6.1 Areas to explore

Confirmation of the power of this technology tool can be achieved through several studies that provide similar findings from different technology backgrounds. In the current research, extending a particular study to identify the disadvantages of Twitter along with discovering any possible effects in this case, seems worth conducting, as it claims against the positive capacity of Twitter in the learning environment. Evaluating both aspects strengthens the evidence provided by the current study.

2.7 Positive capacity

This section will discuss the positive capacity of Twitter in education, highlighting its potential for sharing educational resources, communicating with classmates in relation to course related topics, encouragement, and educational goals.

Twitter is operated by students for various educational activities, such as sharing documents, videos, resources, multimedia, animated videos, audio, materials, and following the links to external resources or pages (Oye *et al.*, 2012). In particular, a study that exposed the purpose of using Twitter in educational contexts found that it is used for exchanging materials such as images, video, and PDF files, as well as leaving comments for their peers. (Pavlovic *et al.*, 2015). To support this, receiving immediate and frequent course information and sharing valuable information from outside the textbook with school friends were reported as positive Twitter outcomes (Bista, 2015). These outcomes emphasise the power of Twitter in sharing educational resources and being able to reach such a facility through a single tool increases its positive potential in the learning environment.

Introducing Twitter to students can broaden their access to information and relevant educational materials (Rinaldo *et al.*, 2011). This can be confirmed by students' perceptions of whether using Twitter affects their participation in debates; most participants emphasised that Twitter increased their motivation to contribute to discussions (Tur & Marín, 2015). This is in line with the findings of Oye *et al.* (2012), who discovered that social networks facilitate and improve classroom discussions.

It can be agreed that allowing students to use Twitter for helpful activities, including sharing and receiving immediate and frequent information, may encourage learners to be more active in an educational discipline. To support this idea, participating in classroom activities seems to differ between students who use Twitter as a supplementary tool in the classroom and those who do not. For instance, experimental research has indicated that learners who use Twitter are more engaged in courses than those who do not (Ebner *et al.*, 2010). Previous findings by Kassens-Noor (2012) suggest that Twitter has some benefits over traditional individual homework by facilitating sharing and creating ideas beyond the classroom, in not only allowing users unlimited access, but also maintaining the ongoing discussion beyond course hours. Similarly, Pate (2015) encouraged students to tweet while adopting a student-centred, active learning approach, and determined that learners had a higher level of confidence to ask, comment, and contribute, as well as demonstrating a deeper engagement in their learning and activities. Moreover, they shared references and note-taking using social media.

As discussed earlier in the challenges section, asking questions is a simple approach *via* social media. A study revealed that one of the top teaching Twitter activities enabled students to ask

questions in Saudi Arabia (Alim, 2017). This is a good indication that students were motivated to ask *via* Twitter, and/or they found this facility helpful. West *et al.* (2015) support this and report that students appreciated the value of Twitter in allowing them to establish a connection with their professors as it is easy to ask question using the platform. Facilitating and motivating questions *via* Twitter leads to the concept of communication with classmates for course-related topics. Bledsoe *et al.* (2014) and Helvie-Mason and Maben (2017) report that Twitter helps learners to communicate with class members in real time due to fact that learners see Twitter as a real mode of communication to support their study.

Twitter positively meets the needs of students; for instance, Bista (2015) reports that learning experiences are positive across a variety of course when using Twitter and even though participants had no previous experience in using the technology tool, they admitted that it offered them the space and opportunity to engaging in academic practice. Notably, participants were graduate students. Twitter facilitates learning *via* information sharing, ongoing event awareness, advocacy efforts, and by enhancing the connections among learners, professionals, and faculty members (Anthony & Jewell, 2017). This could acknowledge that Twitter helps students to meet their educational goals.

In a survey reported by Becker and Bishop (2016, p. 13), most of the participants agreed that Twitter enabled them to create connections between their interests, their own lives, and the sciences. The majority of students corroborated Twitter as a learning tool by making comments such as ‘Twitter has made me think about things that I like and about the science related to them’. The same study showed that more than half of the participants agreed on the possibility of Twitter in assisting them to think creatively about novel methods and communicating for science purposes.

Further evidence can be found in research by Tur and Marín (2015), who investigated the benefits of learning with Twitter and found that approximately 89% of the students who participated believe that Twitter’s activities helped them prepare for roles they must perform in a face-to-face setting. In the same study, the enhancement of learning with Twitter was also evaluated based on students’ perceptions; approximately 85% of the participants declared that they enjoyed and learnt from activities *via* Twitter. Thus, Twitter has the power to support learners in meeting their educational goals.

Introducing Twitter into the learning environment does not only integrate the most advanced technology in educational discipline, but as a tool for achieving educational goals and students’ desires. This concept is in line with the work of Rhine and Bailey (2011, p. 322), who state that in employing technology in the classroom, ‘our most important task is engaging students in learning. We look to social media not as the latest fad but as a potential vehicle to help us achieve our goals in the classroom’. Therefore, applying social media such as Twitter into education is

considered an advanced technology which has been proven as a tool to accomplish educational goals within a learning environment.

In summary, based on the analysis of the previous results, there is a clear indication that Twitter has a positive capacity for educational use. Pavlovic *et al.* (2015, p. 44) claim that Twitter continues to show great findings, both in enhancing learners' motivation to actively participate in the learning process and the quality of the knowledge acquired. Likewise, an earlier survey-based experiment, claimed that Twitter is a valuable platform to complement traditional forms of instruction (McArthur & Bostedo-Conway, 2012).

2.7.1 Areas to explore

It is known that social media combines both technology (including its capacities, such as technology affordance) and social practice (such as information sharing, collaboration, connecting with others, and as a tool to fulfil educational desires). The capacity of technology may either limit social practice or facilitate it, and, as social media is a term that encompasses different technological tools, these tools can vary in terms of capacity. Based on an earlier finding, Twitter is a tool that has a great potential in education and extending this affordance would be interesting to evaluate such capacity from wider perspectives, based on different languages, technology culture, material content, and practice. Therefore, it would be interesting to measure Twitter's positive capacity in relation to education from the perspective of Saudi students.

2.8 Engagement

Students' engagement in the educational process is fundamental to teaching and learning. This section begins by providing a definition of engagement. According to Astin (1984, p. 518), engagement refers to the 'amount of physical and psychological energy that the student devotes to the academic experience'. A recent proposed definition regarding student engagement is identified as participation in educational practices, both in and out of the classroom, which indicates a range of graded outcomes (Quaye & Harper, 2014). Kuh, Kinzie, Cruce, Shoup, and Gonyea (2006) highlight the amount of time and effort students put into their educational activities, which leads to an increase in educational engagement.

When utilising traditional forms of education, some educators find it difficult to keep students engaged (Dhir *et al.*, 2013). However, Twitter has been identified as a tool that can enhance students' engagement in educational activities. To support this, Veelo (2009) discovered that integrating Twitter in learning activities boosts students' engagement, even after class. Based on survey results, Evans (2014), discovered a strong correlation between the amount of Twitter utilisation and the level of learner engagement. This follows the same line as an earlier study, which found a positive correlation between university students' engagement and the use of social networks; in other words, students who regularly used social networks participated in and spent more time on university campus in comparison to those who did not use social networks frequently (Heiberger & Harper, 2008). This indicates that Twitter may play an important role in elevating the level of engagement in online courses among students, as well as among students and their instructors (Dunlap & Lowenthal, 2009; Neal, 2012).

Adding to this, results found by McArthur and Bostedo-Conway (2012) indicate that Twitter is a valuable platform to complement traditional forms of instruction, and this could be why engagement is boosted. During a controlled experimental study, investigators found that integrating Twitter in the classroom resulted in a positive impact on semester grades and engagement, as the engagement of experimental students increased significantly compared to the control group (Junco *et al.*, 2011). From this, it could be deduced that enhancing students' engagement and reducing the number of learners who disengage in educational activities, results in the development of students' overall learning process (Evans, 2014). In this regard, it is worth highlighting that engaging for education purposes can be limited to instructors' requirements, for instance, research has demonstrated that students did not engage in activities with each other unless it was required for course credit (Veletsianos & Navarrete, 2012).

Even though Twitter shows an optimistic outcome related to educational engagement, not all social media tools appear to be a supportive method of boosting learners' engagement. For instance, unlike Twitter, Cole (2009) found that Wiki has little effect on students' engagement as participants did not post on the platform.

To conclude this section, West *et al.* (2015) state that Twitter positively contributes to students' engagement. Thus, Twitter seems to be a wonderful tool that enhances learners' engagement during educational activities; however, this level of engagement fluctuates among users.

2.8.1 Areas to explore

Based on earlier discussions, it seems that Twitter can be applied to a learning environment to enhancing learners' engagement. According to extant literature, Twitter has shown positive results in student engagement; however, these are not located in Saudi Arabia. The results of Twitter's role in engagement leads the researcher to be more interested in determining whether the perceptions of students in relation to Twitter engagement would be a positive or negative.

2.9 Pedagogical potential in higher education

This section will discuss and present literature relating to Twitter as a pedagogical tool that serves learners' interest. Based on both quantitative and qualitative evidence, Twitter has proven to be an effective pedagogical tool for application in the classroom (Rinaldo *et al.*, 2011). Twitter tends to be a facilitating pedagogical tool that can be simply combined along with other instructional activities (Luo & Dani, 2015). This may motivate students because they do not have to rely on a single way to support their studies, interests and can use the most recent technology.

In higher education, the use of Twitter is in its infancy (Betrus, 2012). Twitter is now not only limited to professional utilisation such as news channels or stakeholders. Higher educational institutions have turned to Twitter to attract students and improve its practices through the use of the platform.

Giving learners opportunities to share their academic interest and express themselves creatively is fundamental for those students who vary in terms of learning abilities in both academic and non-academic classes. Each learner is unique and requires an individual learning experience; people create their own knowledge based on their experience and previously acquired knowledge, while engaging in social interaction (Kop, 2010). Twitter is an example of these learning community tools (Evans, 2015). Individual learners can be linked to a personal learning environment (PLE), which utilises network technologies to connect learners with a wide range of materials and services to support their learning, allowing the sharing of information and feedback from others. PLE enables resource sharing rather than resource protection and allows creativity such as editing, modification, and republishing of recourse, as opposed to being provided with pre-packaged learning objects (Kop, 2010; S. Wilson *et al.*, 2007). Twitter can be utilised by educators, students, faculties, and librarians to build online communities for interaction inside and beyond the classroom; users can utilise Twitter as a community building tool, particularly for personal learning networks (Chamberlin & Lehmann, 2011).

Integrating Twitter into higher education is likely to shift instructors and their students into a wide global network, unless the used accounts are restricted to followers only, which may hinder some instructors when using the platform. Tadros (2011, p. 101) takes a positive stance regarding the use of social media in higher education, concluding that, 'If one is to make any progress in student education, one has to take those changes into consideration. Educators must not only react to new trends and their social impacts, but must also develop new ways of teaching and construct new pedagogies'. This can be taken as encouragement for mastering such a challenge in education and measuring its power in teaching and learning.

Providing learners with opportunities to share their academic interest leads to practising their knowledge and sharing information with others. Twitter has the potential to support this and

nearly all middle grade students share their academic views with others outside their class (Becker & Bishop, 2016). This is important as they can practice their academic interest with a wider group when using Twitter. Support this, Pate (2015) reports that students share their interest of references and note-taking using Twitter. Thus, Twitter facilitates sharing academic interest among users, suggesting that other students may not entirely rely on the instructor for gaining information as they can see others' related tweets.

The provision of opportunities for individuals to express themselves and create their own knowledge are further potential uses of Twitter. A study reports that 81% of 131 students (on a pharmacy management course) insisted on the importance of Twitter in expressing their thoughts and opinions to the class, which otherwise could not have been done (Fox & Varadarajan, 2011). This kind of practice seems valuable for learners to test their own knowledge by sharing it with a wider group of students. Twitter promotes students' involvement in discussions of academic topics; related research determined that students utilise Twitter to generate educational discussions with peers and chat with classmates about their educational interests (Oye *et al.*, 2012). Similarly, Twitter was found to be an effective tool in peer teaching activities, as it facilitates the delivery and receipt of peer feedback (Luo & Dani, 2015). Hence, students had a chance to hold a forum of discussion *via* delivering information and receiving feedback or comments.

2.9.1 Areas to explore

It seems that integrating Twitter into learning creates opportunities for students to express themselves and enhance their learning environment. This will be discussed in relation to the personal learning environment. It would then good to examine Twitter's power in allowing students to express themselves in relation to their learning experience. Furthermore, assessing Twitter with respect to developing students' learning environments is a fascinating area to explore.

2.10 Theoretical background

This section highlights the theories beyond explaining and interpreting the current study in terms of learning. Three theories are used to support the study, including constructivism, the social development theory, and social presence.

2.10.1 Constructing knowledge

Constructivism has been one of the main theoretical foundations for educational analysis during the last 30 years. This section's focus is largely on pedagogical shifts towards a constructivist paradigm, in which learners can criticise, collaborate, and co-construct knowledge, to demonstrate: 'knowledge construction, not reproduction; conversation, not reception; articulation, not repetition; collaboration, not competition; and reflection, not prescription' (Howland, Jonassen, Marra, & Moore, 2003). Technologies are widely seen as a way of allowing a novel approach to constructivism. This can work both ways: allowing learners to take control of their own learning and enriching the social dimension of learning (Conole & Alevizou, 2010, p. 14). Considering Twitter as an example of technology, tweets can include text, photos, and videos or can be a simple 'retweet' of existing posts. Through the use of Twitter, individuals can construct a new tweet and/or participate in discussions, such as commenting about their own thoughts or providing feedback. Linking this into educational contexts, tweets can be constructed to express ideas, paraphrase texts, evaluate opinions, and produce a level of discussion on online platforms, which enhances face-to-face discussion (Sweeney, 2012). Moreover, *via* Twitter, students may also post recordings of lectures, meetings, and presentations, further enhancing discussion (Prestridge, 2014). Students can share their thoughts with all classmates, including absent students who are then able to follow classroom discussion.

In the social constructivism approach, individuals generate meaning through interactions among themselves and the environment in which they live, with meaningful learning occurring once individuals are engaged in social activities (Ernest, 1999; McMahon, 1997). Tay and Allen (2011, p. 153) highlight that collaborative partnerships amongst learners themselves or learners with instructors 'gave real effect to the idea that students learn best when they are required to engage actively with the curriculum material in ways that emphasis the individual construction of meaning and knowledge in a social setting involving interchanges between learners about the nature and content of their studies'.

Across literature, it appears that educational researchers discuss the value of social media with an emphasis on participation, collaboration, and sharing; this indication highlights the significance of the social constructivist approach to learning *via* social media. Tay and Allen (2011) also used this approach and agreed that the advantage of social media for learning is in the way that students

are more likely to construct knowledge as a result of engaging, discussing, posing questions, and receiving answers, rather than simply obtaining and repeating content.

Social media offers students collaborative potential due to the way it works. Learners appear to utilise social media as a place for collaboration, and are, therefore, more likely to involve and engage in a constructivist process. However, the action that the instructor has to take is vital when this approach is established (Tay & Allen, 2011). To show this, engaging learners in social media for constructivist learning has been approached by some researchers, such as Tay & Allen (2011), who explore how social media may be utilised effectively by undergraduate students. The authors believe that the process of implementing social media in educational settings could be more important than the technology itself. Tay and Allen (2011) state that the design and process of interaction *via* social media is more vital than the social media platform itself. This may contribute to the success and/or failure of achieving educational goals when social media, such as Twitter, is implemented.

What is interesting about social media is its emphasis on the interplay between both the technological, which produces the affordance, and social practice of users (Tay & Allen, 2011). Simply incorporating social media services into educational settings may not guarantee that the incorporated technology itself will lead to meaningful improvement regarding learning outcomes. However, not including the wide range of different social media environments that are available for students, this may not necessarily mean that students would be able to immediately adopt and benefit from these technology alone, if they were incorporated into learners' studies (Dron, 2007). However, this does not ignore the importance of social media in the learning environment. According to Tay and Allen (2011), by incorporating the use of social media in the learning environment, both the social media platform itself or students' uses of it may develop, resulting in an improvement in student outcomes.

When social media is implemented into an educational environment, even though the instructor encourages students to use it, students may continue working with the tools at hand or a social media platform that make more sense, to them, for collaboration. Therefore, maximising the benefit of social media in higher education may be achieved through validating students' choice of these tools, for example by choosing a social media tool that is convenient and familiar to the students and one which makes sense in relation to achieving the educational task (Tay & Allen, 2011). This leads to the important concept of both students and instructors having an important role in achieving an effective approach to media literacy and their responsibility in accomplishing this collaboratively (Gammon & White, 2011).

2.10.2 Social development theory (Vygotsky)

Vygotsky's (1962, 1978) theory emphasises the central role of social learning; as Vygotsky (1962) defines, learning is inherently a social activity that takes place through social interaction. He also posits that social interaction precedes development; or in other words, cognitive development requires social interaction. Consequently, the major concept underpinning Vygotsky's theory is that social interaction plays a primary role in the development of cognition. He states, 'Every function in the child's cultural development appears twice: first, on the social level, and later, on the individual level; first, between people (interpsychological) and then inside the child (intrapsychological)' (Vygotsky, 1978, p. 57).

With regard to the social development theory, learning occurs from interaction with a 'more knowledgeable other' (MKO). The MKO refers to any person who has a higher level of understanding or capabilities than the learner with respect to a specific task, concept, or process, and can be a teacher, parents, a tutor, someone older or younger, or even a computer (L. S. Vygotsky, 1978). Regarding Twitter and learning, MKO can be achieved easily when Twitter is implemented, for example tweeting to MKOs, who can be peers, instructors, or any Twitter users to gain information.

Another aspect of Vygotsky's theory is the idea that learning occurs in a 'zone of proximal development' (ZPD) and that the potential for cognitive development relies on this zone. The ZPD is the distance between a student's ability to perform a task under adult guidance and/or with peer collaboration and the student's ability to solve the problem independently. In other words, the ZPD is the area in which the skills are too difficult for a learner to master on their own, yet these difficulties can be overcome with the guidance of a more knowledgeable person (L. S. Vygotsky, 1978) (see Figure 2.1).

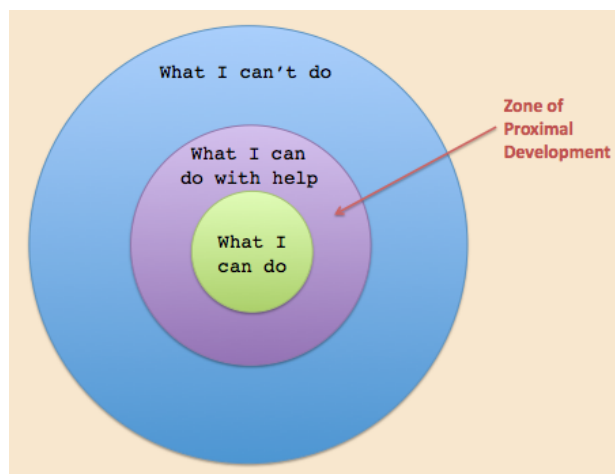


Figure 2.1: Vygotsky's zone of proximal development (ZPD) (Vygotsky 1978)

Vygotsky's (1962, 1978) theory is applied widely to develop understanding of the social aspects of learning.

Since social media facilitates the potential for sharing peoples' knowledge and experiences in an online community (Ngai, Moon, Lam, Chin, & Tao, 2015), studying knowledge and sharing experiences are vitally important in social media. Distributed knowledge or experiences can take the form of texts, photos, videos, or voice recordings. This study believes that social media has shaped the way people communicate, interact, share, and learn (Al-Khalifa & Garcia, 2013; Bosch, 2009), which can influence or generate new learning techniques as well as alter pre-existing methods for learning. This supports the belief that media creates or influences human behaviour and alters pre-existing behaviour (Bandura, 2001).

The most basic instructional implication is that students should be provided frequent access to models of the knowledge, skills, and behaviours they are expected to learn. Students pay attention to knowledge and take into consideration knowledge characteristics, such as distinctiveness, affective valence, prevalence, complexity, functional value, relatedness, and usefulness. Furthermore, according to Bandura (1977), students have to be motivated to engage in what is being observed. Hence, in this study, using social media can be considered a social motivator for engaging in specific tasks. This can be associated with the beliefs of Poore (2016), who states that social media is more likely to be utilised as a motivational feature for learners than a distraction tool.

In social media, feedback techniques can also be used to reinforce behavioural changes and assist learners in fulfilling their enquiries. For example, when a learner performs a task, he/she can be advised on whether their performance is correct or not. Additionally, immediate corrective feedback can be provided when needed, and can be given by an MKO, such as a lecturer, a peer, or another student who has better understanding. According to Vygotsky, this collaboration with an MKO can contribute to cognitive development.

2.10.3 A non-verbal community

Communication *via* Twitter mainly occurs non-verbally, which may minimise the power of the platform in comparison to verbal communication tools. Some communication theories have drawn considerable attention to the lack of non-verbal communication in text-based channels. For instance, Short, Williams, and Christie (1976, p. 59) conclude that the 'absence of the visual channel reduces the possibilities of expression of socio-emotional material and decreases the information available about the other's self-image, attitudes, moods, and reactions'. However, Garrison (2011) attempts to address the question of whether the nature of written language can

compensate for a lack of visual aspects. Garrison (2011) reported studies conducted by Garrison and Arbaugh (2007) and Rourke & Anderson (2002) by stating that it was exposed that learners can overcome the lack of non-verbal communication by founding familiarity *via* the utilisation of encouragement, greetings, paralinguistic emphasis (e.g. emoticons punctuation, capitals), and personal vignettes (i.e. self-disclosure). Moreover, written text may encourage critical thinking and facilitate discourse due to the fact that text-based discourse is reflective, explicit, and precise.

2.10.4 Community of inquiry

Adopting e-learning has the potential to encourage a collaborative learning environment, which serves educational objectives such as gaining multiple sources of information. Learners can post materials and criticise them collaboratively, resulting in gaining knowledge. This could lead to the idea that ‘The creation of knowledge in an educational context is a reflective and collaborative process made possible by a community of learners’ (Garrison, 2011, p. 19). The concept of education as a community of learners has to be practical in a community relying on creativities and knowledge construction.

Like any educational experience, having effective and successful e-learning relies on the ability of the instructor to generate a learning atmosphere that motivates learners and facilitates educational activities (Garrison, 2011). Therefore, it is worth noting that having a successful Twitter experience in an educational context greatly depends on the ability of the educators in monitoring learning activities.

Using e-learning provides new and more effective approaches to learning with remarkable challenges in relation to new technology (Garrison, 2011). These challenges create two correlated factors, known as ‘online communities’, which serve ‘learning environments’. The presence of both factors is fundamental in education. These are complementary; the importance of communities and learning can be supported by a positive correlation between perceived learning and the sense of strength in the community (Moller, Harvey, Downs, & Godshalk, 2003). Hence, having a strong community serves the learning outcome. In this regard, inquiry communities have three key elements. However, the current research mainly relies on social presence when expressing the results; this will be discussed in more detail in the following section.

2.10.5 Social presence

The emphasis on social presence is essential to support inquiry and the approach of particular learning outcomes. Thereby, this section will undertake the first element of the theoretical

framework from the Community of Inquiry, developed by Garrison (2003). Social presence can be defined as ‘the ability of participants to identify with a group, communicate purposefully in a trusting environment, and develop personal and affective relationships progressively by the way of protecting their individual personalities’ (Garrison, 2011, p. 23). It is asynchronous text-based communication, which would appear to present a particular challenge in generating a social setting and inquiry community. In an academic context, social presence refers to creating an environment that supports and encourages probing questions and the involvement of explanatory concepts. This potential leads to critical discussion. However, maintaining critical thinking and discourse requires a degree of belonging, which can develop over time (Garrison, 2011).

Social presence encompasses three elements: interpersonal communication, open communication and cohesive communicative responses, although sharing socio-emotional feelings is not the main focus of social presence (Garrison, 2011).

2.10.5.1 Interpersonal communication

Interpersonal communication is necessary for opening and establishing an academic environment that includes interest and persistence. Interpersonal communication generates an atmosphere and sense of belonging to a group, which is an educational objective, and leads to engagement in meaningful discussion. This type of communication consists of three key indicators: affective expression, self-disclosure, and use of humour. Eventually, knowing more about the members of the community results in increasing levels of trust and responsiveness (Garrison, 2011).

2.10.5.2 Open communication

Open communication is directly affected by interpersonal communication. It is emphasised that ‘open communication requires a climate of trust and acceptance that allows questioning, while protecting self-esteem and acceptance in the community’, and this community is built on the process of knowing, complimenting, responding to inquiries, and the contributions of members (Garrison, 2011, p. 39).

2.10.5.3 Cohesive responses

The previous indicators of social presence directly contribute to cohesive responses. Group cohesion is the goal of social presence, and, according to Garrison (2011, p. 39), ‘constricting meaning, confirming understanding, and completing collaborative activities can only be

successfully achieved in a cohesive community'. Therefore, concurrently attending all three categories is vital in the development of social presence.

Having presented the main categories of social presence, it is important to note that its vital aim is not social interaction and/or maintaining members for personal reasons, but to ensure the quality of learning experiences for all members (Garrison, 2011).

2.10.6 The importance of social presence

There is a significant relationship between perceived social presence and satisfaction with online discussions. Learners who have a high level of social presence appear more in online discussion, in contrast to the students that have a low level of social presence (Swan & Shih, 2005). Moreover, social presence was essential for minimising the obstacles which the participants encounter in order to increase students' willingness for sharing their experiences and contributing in classroom conversations (Redmond, 2011). Garrison (2003, p. 49) believes that social presence is needed for development of community as it is not conceivable to assume that individuals may generate community without some degree of social presence. This leads Lomicka and Lord (2012) to speculate that the development of a community, both in and beyond the classroom, is a fundamental aspect for having an effective educational process.

Creating a learning community is vital due to the fact that individual knowledge is very much shaped by the social environment, as an environment with choice and diversity of perspectives will encourage critical and creative enquiry (Garrison, 2011). Dron (2007, p. 62) proposes student-group interaction in the social software environment, stating that 'the learner is a part of the group mind, influencing yet influenced by it. This dual role makes the notion of control very fluid'. Therefore, it can be said that learners are more likely to influence each other as they discuss a point or respond to a particular question. This response significantly influences the followers or those who pose questions and participate in discussions.

2.10.7 Social presence *via* Twitter

Overall, it was found that students who were satisfied with the university campus environments they were in, were more likely to persist in their involvement with academic communities (Schreiner, 2009). Accordingly, Twitter is a social media application that supports university social activities and allows users to build relationships with others in the campus through the setting of personal profiles and interacting in open, or private, online environments with others, enabling them to share their latest activities, photos, and thoughts with selective or open

communities. Having provided and allowed students to use such technology could result in increasing their satisfaction in relation to a university online community, which may also encourage them to meet their educational needs. Nonetheless, the added value of Twitter in educational practices needs to promote the sharing of information and ideas and maintain the learning community, rather than merely socially network with strangers.

Introducing communication technology into the traditional education approach in which learners are passive is seen as a fundamental mistake. Adding e-learning to the passive approach results in failure because the role of educators and students in e-learning environments are not the same as in traditional face-to-face classroom settings (Garrison, 2011). In addition, it must be highlighted that the ability of the instructor leads to the successful implementation of technology rather than the presence of the technology alone. For instance, Garrison (2003, p. 24) states that, like any educational experience, successful e-learning relies on the capability of the instructor to create a learning environment that enhances individuals' motivation and encourages meaningful and worthwhile learning activities and outcomes. Shifting the focus to social media appears to indicate that the effectiveness of Twitter in the educational discipline may depend on the course content, the assignment task, and the instructors' and students' expectations from the platform (Preston *et al.*, 2015). Lomicka and Lord (2012) found that participant population, the task involved, a well-designed task, and an appropriate choice of tools for the task contribute to the achievement of the educational goal and the creation of communities through Twitter.

Twitter can enhance social presence in online settings; this was determined by Dunlap and Lowenthal (2009) during their use of Twitter for just-in-time social connections and interactions. Similarly, in later research, Solmaz (2016) demonstrates that social presence was clearly presented in focal students' tweets. His outcomes revealed that incorporating microblogging tools into the learning discipline enabled a pre-service language teacher to establish social presence. Moreover, the participants had a positive experience towards integrating Twitter in their class setting and establishing social presence. However, this study was limited to a similar course design and geographical location. Similarly, Lomicka and Lord (2012) found that Twitter enables students to generate social presence and build a community, with social presence clearly presented in the students' tweets. According to previous authors, the community was initially built for face-to-face meetings, which were restricted to a physical classroom, after which it was extended beyond the classroom in a fun and rapid manner. As a result, Lomicka and Lord (2012) concluded that, based on both survey and content analysis, Twitter is capable of allowing learners to generate a community and construct social presence. In addition, a recent study conducted by Baisley-Nodine, Ritzhaupt, and Antonenko (2018) revealed that social presence can be established through students' tweets, which indicates that Twitter is a beneficial tool for creating an online learning environment.

Garrison (2003, p. 49) believes that social presence is needed for the development of a community. This led Lomicka and Lord (2012) to develop a class community *via* Twitter, both in and beyond the classroom, to promote an effective educational process. To conclude, in the educational discipline, instructors can utilise Twitter to encourage their students to tweet in a variety of ways: to tweet questions and queries among themselves, to send direct messages between one another, share information, share links to student resources, exchange personal experiences, and participate in discussion.

Chapter 3: Methodology

3.1 Introduction

The aim of this chapter is to describe and justify the methodology and research design chosen for this study. This chapter also presents the methods adopted to answer the research questions. The outline of this chapter is as follows. First, the philosophical worldviews and research paradigm will then be briefly explained. What follows is a discussion between quantitative and qualitative approaches, and then, an overview of research methods available in the social sciences field. Following that is a discussion of the research design employed in this study. Next, there is an in-depth examination of the phases of research design, illustrating sampling, procedures, and the limitations of techniques utilised. The chapter concludes with a summary.

3.2 Research paradigm and approach (philosophical worldviews)

Conducting research is classified as a systematic investigation (Burns, 1997). Researchers often commence their study with certain assumptions about how and what they will learn during their study, known as ‘knowledge claims’. These may be recognised as paradigms (Creswell, 2003), which is defined by (Kuhn, 1962, p. viii) as ‘universally recognised scientific achievements that for a time provide model problems and solutions to a community of practitioners’ or ‘a loose collection of logically related assumptions, concepts, or propositions that orient thinking and research’ (Bogdan & Biklen, 1998, p. 22). In other words, a research paradigm is a ‘framework that guides how research should be conducted; it is based on people’s philosophies and assumptions about the world and the nature of knowledge’ (Collis & Hussey, 2014, p.10). However, the term ‘paradigm’ is applied quite loosely in academic research and may refer to various aspects and different people (Collis & Hussey, 2014). Morgan (1979) advocates that the word ‘paradigm’ can be applied to three different aspects:

- For the philosophical aspect, it is applied to reflect certain beliefs about the world;
- For the social aspect, it is applied to provide direction on how the research ought to be conducted; and
- For the technical aspect, it is applied to assign the methods and techniques to be employed.

Having provided brief perspectives related to research paradigms, which are derived from different scholars, it seems important to look at the terms in more depth to understand how they

may relate to this research. The current study is influenced by and has adopted the point of view of Creswell (2013).

Creswell (2013) prefers the term ‘worldviews’, which is explained as ‘a general philosophical orientation about the world and the nature of the research the researcher brings to the study’ (p. 6). According to the author, there are four worldviews that are widely discussed in the literature: postpositivist, constructivist, transformative, and pragmatic. Although these philosophical concepts may not always be clear within the research or explicit to the researcher, they have an impact on the research being conducted, and must, therefore, be recognised by researchers as being present. Thus, the choice of following a quantitative, qualitative, or mixed approach is affected by the nature of the beliefs about these philosophies. Collis and Hussey (2014) assert that the two main research paradigms or philosophies are positivism and interpretivism. It is also noted that preceding paradigms are sometimes associated with the terms ‘quantitative’ and ‘qualitative’, respectively (Collis & Hussey, 2014; Creswell, 2012). Subsequently, the succeeding sections explicate the previous terms in more detail.

Positivism is a perspective from which ‘reality is independent of us and the goal is the discovery, based on empirical research’ (Collis & Hussey, 2014, p.44). Knowledge is gained from ‘positive information’ and can be scientifically demonstrated. To apply this paradigm, the researcher needs to be as objective as possible, and this approach tends to assume that the act of investigating social reality has no influence on that reality (Collis & Hussey, 2014). This approach is most typically associated with a quantitative study, whereby investigators generate claims for knowledge based on cause-and-effect thinking or determinism, testing theories, reductionism, or detailed observations and measurements of variables (Creswell & Plano Clark, 2011).

On the other hand, interpretivism believes that ‘social reality is not objective but highly subjective because it shaped by our perceptions’ (Collis & Hussey, 2014, p. 45). This paradigm is associated with the concept that it is impossible to isolate what is in the investigator’s mind from what exists in the social world. Thus, the act of investigating social reality has an influence on what is being investigated. Interpretivism concentrates on exploring the complexity of social phenomena. This approach is typically associated with a qualitative study, in which the meaning and understanding of phenomena are shaped by perspectives of participants (Creswell & Plano Clark, 2011). It should be made clear that these associations are not necessary. It is possible to use quantitative research in an interpretivist way and to take a positivist stance in relation to qualitative data.

Positivism or interpretivism are often applied separately in conducting research, along with their associated research methods. However, research methods can be mixed in a single research design, and each method produces certain types of data, which are then used separately to address particular research questions or are combined to address others (mixed methods).

In relation to the underpinning paradigms applied to mixed methods, there are several stances that the researcher needs to consider in relation to what is best for their studies. These include whether there is one best worldview for mixed methods, or whether multiple worldviews in mixed methods are compatible, and the current understanding of worldviews in relation to the type of mixed methods design and worldviews depending on the scholarly community (Creswell & Plano Clark, 2011).

This study follows the worldview related to the type of mixed methods design, which means that more than one method can be adopted to produce a mixed methods design in relation to the research questions (Creswell & Plano Clark, 2011). First, a quantitative method (a questionnaire) was used to explore patterns in the responses of students. Then this study shifted to a more qualitative method, in the form of interviews, both to validate and extend understanding in relation to the research questions. As the researcher, I believe that this approach is the best to address the research questions and that it is not necessary to take a particular stance in relation to one 'worldview', but rather to be aware of these worldviews in shaping our interpretation of the findings in relation to the research questions.

3.3 Methods and methodology

In planning research, it is vitally important to understand the distinction between methods and methodology. The term 'methodology' is known as 'an approach to the process of research encompassing the body of methods' (Collis & Hussey, 2014, p.10), whereas a 'method' is a 'technique for collecting and/or analysing data' (Collis & Hussey, 2014, p.55). The difference between methodology and methods can be identified as follows: methods are closely associated with specific research questions and the source of data collected (Grix, 2002), whereas the decision on which methodology to adopt plays an important role in selecting a specific method.

3.4 Quantitative and qualitative research approach

Quantitative and qualitative research methods are two broad approaches to research data. Therefore, this section undertakes a discussion of these two approaches, as defined in the literature review and in relation to this study.

3.4.1 Quantitative research

Quantitative research is an inquiry associated with a more objective worldview, such as an experiment or survey (Creswell, 2013). The researcher mainly utilises this approach to develop generalisable knowledge, e.g. cause and effect thinking, reduction to specific variables and hypotheses and questions, use of measurement and observation, and the testing of theories. According to S. Merriam (2009), a quantitative study provides an opportunity for researchers to gain an understanding on how others perceive their experiences and construct meaning from their experience. Consequently, this study basically relies on quantitative data from a questionnaire in order to understand patterns in students' perceptions of their experience with social media, particularly Twitter.

3.4.2 Qualitative research

Qualitative research is an inquiry that is often associated with a more constructivist or interpretivist worldview, such as ethnography and the grounded theory (Creswell, 2013). The researcher mainly utilises this approach to develop knowledge in relation to particular phenomena and events. This approach includes the multiple meanings of individual experiences: socially and historically constructed meanings with the intention of developing a theory or pattern, or advocacy/participatory perspectives, such as political or issue-orientated, which might be collaborative, change-orientated, or both.

3.5 Mixed methods

This study will adopt a mixed-methods approach (Creswell, 2012). This approach can be defined as, 'the class of research in which the researcher mixes or combines quantitative and qualitative research techniques, methods, approaches, concepts or language into a single study' (R. B. Johnson & Onwuegbuzie, 2004, p. 17). The basic rationale for this design is the need for quantitative and qualitative data to answer the research questions and elaborate on the findings of each method in relation to each other. A mixed-methods approach may also provide a deeper understanding than either single method would provide by itself (Creswell, 2012). Bryman (2007) argues that 'bringing quantitative and qualitative findings together has the potential to offer insights that could not otherwise be gleaned'.

3.5.1 Mixed-methods design

Since 1990, the popularity of mixed-methods research has grown in social science, encompassing the field of education (Arthur, 2012). In its very basic form, mixed-methods research involves a combination of quantitative and qualitative approaches with an ambition to achieve a richer and broader understanding of social phenomena than is possible using either a quantitative or qualitative approach alone. In other words, a mixed-methods approach can be defined as, ‘the class of research where the researcher mixes or combines quantitative and qualitative research techniques, methods, approaches, concepts or language into a single study’ (R. B. Johnson & Onwuegbuzie, 2004, p.17).

Some researchers believe quantitative and qualitative methods refer to a different group of paradigms; Collis and Hussey (2014) presume that researchers should use the term ‘mixed methods’ when they intend to use methods from different paradigms.

In terms of research design, the mixed-methods approach has its own design like any other approach. The mixed-methods research design is a process that includes collecting, analysing, and mixing both qualitative and quantitative methods in either one or several studies, for the purpose of understanding a research problem and answering a specific research question (Creswell & Plano Clark, 2011).

Creswell and Plano Clark (2011, p. 53) identify research design as ‘a procedure for collecting, analysing, interpreting, and reporting data in research studies’. Mixed-methods design can be fixed and/or emergent.

A fixed mixed-methods design is a study in which the use of qualitative and quantitative methods is planned and predetermined for the study’s procedures, whereas an emergent mixed-methods design is refined during the study when mixed methods are needed due to issues that arise within various procedures. In other words, an emergent mixed-methods design happens when another approach, either quantitative or qualitative, is added into an ongoing study because one method is found to be insufficient (Creswell & Plano Clark, 2011).

This study follows the fixed mixed methods design procedure. Specifically, following the classification developed by (Creswell, Plano Clark, Gutmann, & Hanson, 2003), this study adopts a sequential explanatory design, which is the most popular design in educational research (Creswell, 2012).

3.5.1.1 Convergent parallel mixed methods

To be more precise, while several mixed-method designs exist, the primary models in the literature of social sciences today are convergent parallel, exploratory sequential, and explanatory sequential (Creswell, 2013). These types of models will be broadly discussed, with an emphasis placed on the explanatory sequential due to the fact that explanatory sequential is the design adopted in the current research.

In this design, investigators merge or converge both quantitative and qualitative data for the sake of providing a comprehensive analysis of the research problem. Basically, in this form, researchers gather the two kinds of data at approximately one point in time then combine the information in the phase of interpretation of the overall result (Creswell, 2013).

3.5.1.2 Exploratory sequential mixed methods

Unlike the convergent parallel, data in this form are collected during two different phases. First, the investigator launches a study with a qualitative phase then explores the views of participants; thereafter, the data are analysed and the information is utilised to lead into a second stage, which is a quantitative phase (Creswell, 2003).

3.5.1.3 Explanatory sequential methods

An explanatory sequential mixed-methods design appeals to individuals with a strong quantitative background. In this design, the investigator initially conducts quantitative research and analyses the findings; thereafter, he builds on the findings to explain results in further detail through qualitative research. The term ‘explanatory’ is derived from the concept of utilising qualitative data to explain the initial results from the use of quantitative data. The term ‘sequential’ is considered for the reason that ‘the initial quantitative phase is followed by the qualitative phase’ (Creswell, 2003, p. 16). This study follows an explanatory sequential design (see Figure 3.1).

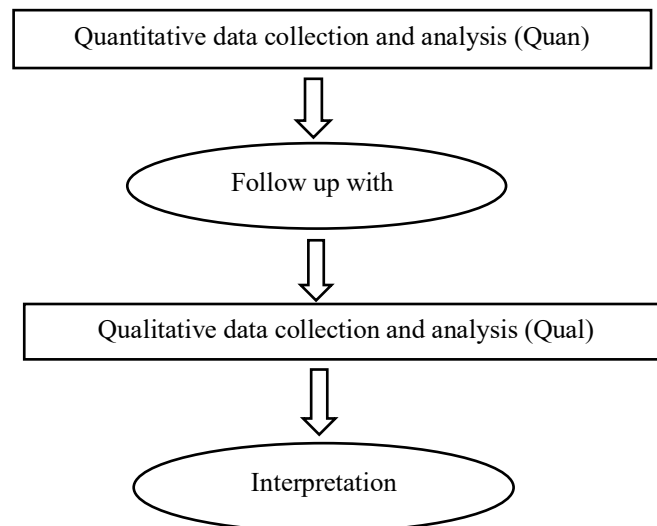


Figure 3.1: Explanatory sequential mixed methods (Creswell, 2013,

3.5.2 Benefits of using mixed methods

Both Arthur (2012) and Denzin (2008) acknowledge that each approach (quantitative and qualitative) has its own weaknesses and strengths; therefore, combining the two can be a fruitful option. Regarding an additional advantage of mixing methods, Bryman (2007) argues that ‘bringing quantitative and qualitative findings together has the potential to offer insights that could not otherwise be gleaned’. Having presented the benefits of mixing both methods, the following sections undertake the limitations of both approaches. This begins by stating the weakness of quantitative research, which can be seen in understanding the context, and that the voices of participants are hardly heard during this type of research. Moreover, quantitative researchers remain in the background, so their personal biases and interpretations are rarely discussed. In connection with qualitative research, it may be considered as insufficient in some cases, due to the fact that personal interpretations are produced by the researcher, which can cause bias. In addition to this concern, the generalising of findings to a larger group is difficult due to the limited number of participants (Creswell & Plano Clark, 2011).

On the other hand, mixing quantitative and qualitative methods can provide more evidence when investigating a research problem than one method by itself. Thus, researchers can collect a wide range of data using all available tools, rather than being limited to one type of data collection, typically quantitative or qualitative (Creswell & Plano Clark, 2011). Indeed, Denscombe (2008) acknowledges that applying mixed-methods research may lead to an increase in the accuracy of data; researchers can also improve their analysis and construct using the original data.

Mixed-methods research argues that the world is not exclusively qualitative or quantitative (Cohen, Manion, & Morrison, 2013). Furthermore, it may appear as an ideal method for in-depth answers to research questions, especially those that cannot be answered using a quantitative or qualitative approach alone. In addition, Creswell and Plano Clark (2011, p. 12) believe that employing ‘mixed methods provides a bridge across the sometimes adversarial divide between a quantitative and qualitative researcher.’

3.5.3 Rationale for the mixed-methods design

The basic rationale for choosing mixed methods is that this study has access to both quantitative and qualitative data. Quantitative data, followed by qualitative data, provide a more comprehensive answer to research questions than choosing only one type. Furthermore, using both types strengthens the data and this rationale supports the concept of adding the interview method to the questionnaire.

With regards to answering the research questions, it can be argued that one type of research approach seems inadequate due to the nature of the questions and the need for additional and precise details compared to a single approach. It can be argued that quantitative data provide a broad overview in relation to research questions, whereas qualitative data provide more precise details about understanding answers in depth and complexity, such as providing an example on how students use social media in relation to their study. Quantitative understanding grows from examining a wide number of participants and evaluating responses to several variables in terms of the patterns of responses. This is in contrast with qualitative understanding, which grows from investigating a small number of participants and exploring their point of view more deeply (Creswell & Plano Clark, 2011). This research investigates students’ experiences of using social media, particularly Twitter, in relation to several factors in their learning environment. Thus, the most appropriate way to understand and explore these objectives is to employ data collection tools frequently linked with a mixed-method research approach, in the form of a questionnaire and interview, to paint a wider picture and obtain further details regarding the current situation.

In particular, even though the questionnaire provides solid data for the research questions, interviews provide excellent examples and descriptions of how students use the tool to boost their learning.

As well as experiencing both quantitative and qualitative methods along with their rich data, mixed research studies are increasingly being accepted in scholarly literature (Creswell, 2012).

The next section presents the instruments applied in the current research.

3.6 Research methods and instruments

This section undertakes a discussion of the research methods and instruments conducted in the study: questionnaires and semi-structured interviews.

It should be noted that the selected methods are determined by research questions.

3.6.1 Collecting and analysing data

The initial concept of collecting data in any research study is to gain information to address the research questions, objectives or hypothesis. In mixed methods research, collecting data encompasses several aspects: gaining permission, sampling, collecting data, recording data, and administering data collection (Collis & Hussey, 2014).

Regarding quantitative and qualitative data collection, the key distinction between them is that in qualitative data, information given as a response to an open-ended question. In other words, the categories or scales for data collection are not predetermined by the researcher. For instance, the questions used to obtain information from participants do not restrict the options of participant responses as it gives them the freedom to speak their mind. In contrast, quantitative information is gathered from closed-ended questions based on several predetermined responses. Furthermore, in quantitative research, the type of information that researchers collect is much less extensive than for a qualitative study (Collis & Hussey, 2014; Creswell, 2013).

The key challenge in this strategy is to decide which quantitative findings are to be followed up, such as those that are statistically significant predictors or have significant related variables. A further challenge is related to second-phase participants: are they the same as those in the first phase? The response to this concern is acknowledged by Creswell (2013), who advocates that the second sample should be the same as the first due to the concept of following up and exploring the results in more depth.

In this study, the data collection procedure comprised of two different phases. The first began by collecting numerical data *via* a questionnaire. The data was analysed to point towards the kind of qualitative questions that might be asked. Thereafter, qualitative data are collected *via* the interview instrument (semi-structured), drawing from the same participants as the previous phase.

In terms of interpretation, this occurs in the discussion chapter. The researcher reports quantitative findings first, follow by qualitative outcomes. This design follows a third form of interpretation based on how the qualitative results provide supplementary data to explain the quantitative findings (Creswell, 2013). Quantitative results are presented, initially, followed by the qualitative findings. The discussion chapter determines how quantitative findings are explained or expanded further *via* the supplementary results, which are derived from qualitative data.

In this study, the data obtained from quantitative and qualitative instruments are analysed independently for each type. They are then presented in separate sections. Subsequently, all of these results are combined in a single discussion chapter.

3.6.2 Questionnaire

A questionnaire is a tool used extensively for collecting scale information, particularly scale data. This sort of method can be administered with or without the researcher being present. Questionnaires are flexible and varied, so researchers can select the most appropriate type for their studies, ranging from highly structured questionnaires to unstructured questionnaire. This instrument presents in various formats, such as multiple-choice questions, dichotomous questions, constant sum questions, Likert-type responses, ranking ordering, and open-ended questions (Arthur, 2012; Cohen *et al.*, 2013). In this study, the questionnaire uses a multiple-choice Likert-type structured format, with open-ended questions because they are useful in creating the frequency of responses amenable to analysis and statistical treatment (Cohen *et al.*, 2013). In addition, this format appears appropriate to measure certain types of research questions, such as ‘to what extent’ questions, which are adopted in the present study. Furthermore, using multiple choice seems ideal for the questions or statements for which no more than one answer can be selected. However, there are some questions for which more than a single answer is accepted; these types of questions are extended with the option of a short, written response, such as ‘other’.

A Likert-type scale of five is commonly utilised, due to the fact that a five-point scale can be managed well unless the target sample are younger participants (Arthur, 2012). It is also a highly common means of assessing attitudes, beliefs, and behaviours concerning a specific topic (Losby & Wetmore, 2012; Weng & Cheng, 2000). There are several features for applying a Likert scale, such as a balanced number of negative and positive response options and all responses having a label (Losby & Wetmore, 2012). The Likert scale is a common procedure for measuring attitudes and its main aim is to gauge the strength of feeling around the research topic field (Bryman, 2015).

This research applies a five-point Likert scale. This means that there is middle value added to the applied questionnaire. Therefore, since this study tends to apply the middle value of responses in the scale, it is vitally important to consider this feature: having a middle value provides people with a way ‘out’, so it is an ideal way to ensure that respondents are not forced into presenting positive or negative views (Losby & Wetmore, 2012). In addition, this questionnaire may present some statements that participants may not yet have experienced; therefore, it is crucial and fair to keep it in rather than forcing them to choose either positive or negative answers. Nearly all of the statements in the current questionnaire are adopted from a five-point scale type.

Meric and Wagner (2006) discovered that numerical format manipulation fundamentally affected mean responses but not scale reliability. Weng and Cheng (2000), who investigated the influence of response order in the five-point Likert-type scale, found that it had no significant influence on scale characteristics and participant responses. However, they placed emphasis on participants' motivation and on using unambiguous statements, as these lead to stable, more critical results.

3.6.2.1 Length of questionnaire

There is always tension regarding questionnaire design. On the one hand this study seeks to obtain as much relevant information as possible; on the other hand, the questionnaire is committed to seeking only data that are required. To assess the length of the questionnaires, the researcher piloted the instrument; it was determined that the time required to fully complete the questionnaire was approximately 15 minutes. This is important for two reasons: first, the time required to complete it should be stated in advance so respondents can make an informed choice; second, a long-winded instrument leads responders to withdraw from completing the questionnaire, potentially affecting the sample size.

3.6.2.2 Wording

It is commonly known that there is significant scope for alternative interpretations of wording. Thus, it is crucial to keep questions and statements short and directly to the point, so they are easily understood by respondents (Arthur, 2012). This also emphasises the idea of piloting this questionnaire before commencing the actual study to avoid any ambiguous words or statements.

It is well known that individuals are prepared to give an opinion on issues of which they have no knowledge (Arthur, 2012). Therefore, it is vital to know whether the participant has actually used Twitter before asking them for information for the study itself; for instance, question 12 asks whether the participant has used Twitter for the selected course.

3.6.2.3 Translating the questionnaire

The questionnaire moved through two phases – first, from English to Arabic, then a 'back translation' technique was used.

Initially, the questionnaire was designed and created in the English language, whereas the target sample are Arabic speakers. The questionnaire was translated into Arabic and sent to seven native

Arabic speakers to retrieve their comments and suggestions regarding the possibility of any ambiguous wording. For further reliability, three competent translators were chosen: one studying for a PhD at Newcastle University (linguistic major), and the other two, competent research educational technologists at Hull University and Newcastle University. It is worth noting that all of the competent people who are checking the translation are bilingual (Arabic and English).

Back translation is a procedure for translating a survey or document items that have already been translated into a foreign language (e.g. Arabic) back into the original language (e.g. English). It is advised that this is performed by a third party. Back translation is commonly applied in cross-cultural measurements (Brislin, 1970; Chapman & Carter, 1979). Thus, it attempts to keep a balance between the original and target versions for evaluation Figure 3.2.

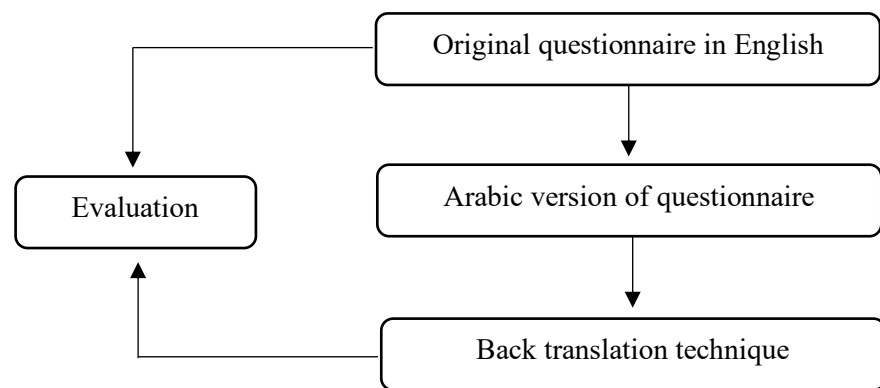


Figure 3.2: Questionnaire translation process

3.6.2.4 Paper-based and computer-delivered questionnaires

There are several fundamental ways of distributing questionnaire instruments for data collection, such as paper based, online, face-to-face, and *via* phone calls. The traditional way of distributing a questionnaire is known as the paper-based method. However, nowadays, the delivery is more likely to be conduct *via* computers, which appears to be increasingly popular amongst researchers (Arthur, 2012). It can be argued that each method of circulating questionnaires has its strengths and weaknesses; these are presented in Table 3.1.

Table 3.1: Strengths and weakness of various questionnaire formats (Arthur, 2012; J. R. Evans & Mathur, 2005)

Type	Strengths	Weakness
Paper-based	<ul style="list-style-type: none"> • Easy to manage for a small number of participants • Simple to run off copies • Well established 	<ul style="list-style-type: none"> • Printing paper can be expensive • Needs data entry • Hard to be used for long distances • Losing papers can occur
Computer-delivered	<ul style="list-style-type: none"> • Easy to use with a large number of participants • Very economic • Quick data gathering • No data entry • Flexibility • Convenience • Control of answer order • Required completion of answer • Speed and timeliness 	<ul style="list-style-type: none"> • Access to the questionnaire requires a computer or electronic devices • Low response rate

The present study applies a questionnaire using a computer-delivered method (online), using the Bristol online survey tool. It can be argued that the targets of the study are people who are likely to be familiar with modern devices, so accessing online questionnaires should not appear difficult, as they can respond using their mobiles. Even though an online questionnaire is utilised in the current research, a paper based one could be applied if the response rate is low or further issues emerge.

3.6.2.5 Construction of the questionnaire

The initial step in constructing the questionnaire was to review a wide range of existing literature. The creation focused on several specific area dimensions: demographic data, challenges, obstacles, the disadvantages of Twitter, the positive capacity of Twitter, engagement and pedagogical potential in higher education (personalised). Although the target sample of the current study are Arabic native speakers, the instrument is written in the English language to avoid any ambiguity and complexity, and the sources of reviewed literature are also published in the English language.

Before presenting selected items in line with their original sources, it is essential to discuss the reason behind chosen statements. It should be noted that items in the current questionnaire are adopted from specific Twitter literature and non-Twitter literature such as those used for Facebook or other technology tools.

The focus in this section is specifically on why these elements were chosen, rather than why they are group together under a single factor because these items were constructed (group) in factors (dimension) as a result of factor analysis.

This study seeks originality in both adopting items from non-Twitter literature and literature that is conducted in different geographical areas. Furthermore, adopting items fluctuates from one literature to another, to reduce repetition for some items with similar meaning.

3.6.2.5.1 Dimension 1: Challenges

In this section, the reasons for selecting particular items will be discussed along with presentation of original sources.

Overview of the rationale for selecting items for the challenges factor

Elements in this dimension are selected from six studies; these will be explained below and presented in Table 3.2.

Four items were selected from Tur and Marín (2015), foregoing a study focus on the educational experience of learners utilising Twitter for debate activities in Spain, with data collected from a questionnaire and content analysis. In previous research, these items were particularly used to assess the influence of utilising Twitter on learners' participation in debate activities and their experiences of using Twitter. Thus, it would be beneficial to examine these items in a different country using an interview instead of content analysis.

Nine elements were chosen from Barczyk and Duncan (2013), whose prior research sought students' attitudes and thoughts about courses in which Facebook was integrated. In these studies, items were used to assess students' attitudes towards Facebook-enhanced courses. Therefore, it

would be worth exploring these in terms of Twitter. Items used in the study were related to students' use of technology and the perceptions of their classroom; more importantly, these items were used and validated by original source of statements, indicating also that the roots of these items appear essential in the field. However, this adoption was not used to compare Twitter with Facebook or any other type of technology, but rather to use items to explore the challenges of Twitter in students' learning environments.

Two elements were selected from a previous study by Rinaldo *et al.* (2011), who used these items with others to assess the benefit of Twitter in students' courses. These items are important as they examine learners' comfortability with and thoughts regarding Twitter, based on different research backgrounds.

Three statements by West *et al.* (2015) were previously used to evaluate students' utilisation of Twitter for learning purposes. These statements were chosen to extend the study and attempted to explain the growth in the number of tweets.

One statement related to findings by Vohra (2016). Thus, it would be beneficial to examine this in a different country with university participants instead of students in grade 8.

Two elements were used to evaluate students' use of Twitter in teaching and learning in a dental class (Gonzalez & Gadbury-Amyot, 2016). Due to their focus regarding the use of Twitter in the teaching and learning environment, it is important to evaluate the related items in terms of a different country, subject, and research approach.

Table 3.2: References for questionnaire items usage dimensions: The first factor

N	Items	References
1	Twitter has helped me a lot of to prepare for the role I had to play in the face-to-face debate.	(Tur & Marín, 2015)
2	Using Twitter for classroom discussions is very convenient.	(Barczyk & Duncan, 2013; Duncan & Barczyk, 2013)
3	Using Twitter has made me feel more comfortable engaging in discussions during class time.	(Rinaldo <i>et al.</i> , 2011)
4	Twitter is more effective in the classroom than Blackboard.	(Barczyk & Duncan, 2013; Duncan & Barczyk, 2013)
5	Using Twitter improves the quality of courses.	(Barczyk & Duncan, 2013; Duncan & Barczyk, 2013)
6	I feel Twitter should be introduced more in courses.	(Barczyk & Duncan, 2013; Duncan & Barczyk, 2013)
7	Twitter improves interaction outside of class lectures.	(West <i>et al.</i> , 2015)
8	I believe Twitter benefits my social learning network	(Vohra, 2016), findings
9	Twitter promotes knowledge sharing.	(Barczyk & Duncan, 2013; Duncan & Barczyk, 2013)
10	I feel more connected with classmates when using Twitter.	(Barczyk & Duncan, 2013; Duncan & Barczyk, 2013)
11	I can contact my instructor more often using Twitter, compared with when I did not use Twitter.	(Barczyk & Duncan, 2013; Duncan & Barczyk, 2013)
12	Twitter improves classroom interaction during lectures.	(West <i>et al.</i> , 2015)
13	Twitter has helped me to participate more in debates.	(Tur & Marín, 2015)
14	Twitter provides collaborative learning opportunities.	(Barczyk & Duncan, 2013; Duncan & Barczyk, 2013)
15	The questions and answers on Twitter are very helpful.	(Gonzalez & Gadbury-Amyot, 2016)
16	I enjoy using Twitter in the classroom for asking questions during lectures.	(Gonzalez & Gadbury-Amyot, 2016)
17	Twitter helps me to gain in-depth understanding of the debate topic.	(Tur & Marín, 2015)
18	Twitter has helped to understand the argument of other participants in the debate.	(Tur & Marín, 2015)
19	Twitter is much more useful for the course than I thought it would be.	(Rinaldo <i>et al.</i> , 2011)
20	I acquired personal or professional growth after completing the course.	(Barczyk & Duncan, 2013; Duncan & Barczyk, 2013)
21	Twitter helped me learn course materials more effectively.	(West <i>et al.</i> , 2015)
22	Using Twitter makes learning easier.	(Vohra, 2016), students report in an interview

3.6.2.5.2 Dimension 2: Obstacles

In this section the reason for selecting particular items will be discussed along with presenting the original sources in Table 3.3.

Overview rationale of selecting items for the challenges factor

Item one and nine are widely discussed in the literature, particularly when social media is implemented into the learning environment (Al-Khalifa & Garcia, 2013; DiVerniero & Hosek, 2013; Fox & Varadarajan, 2011; Grosseck & Holotescu, 2008; Lin *et al.*, 2013). Therefore, building upon these studies from different backgrounds allows us to consider whether such a concern is common among students or not.

The second item is also widely discussed, particularly when social media is implemented into the learning environment (DiVerniero & Hosek, 2013; Grosseck & Holotescu, 2008; Tariq *et al.*, 2012). It is important to evaluate this concern in related research as it provides a general picture about the influence of Twitter on students' studies, rather than focusing on particular issues, such as spelling.

The third and eighth items are often mentioned in published studies (DiVerniero & Hosek, 2013; Fox & Varadarajan, 2011; Grosseck & Holotescu, 2008; Oye *et al.*, 2012; West *et al.*, 2015). Since communication with friends for non-educational purposes during lectures may distract students, it is worth exploring whether this seems to be common practice among Saudi students.

The fourth item was identified as a theme of pitfalls during the integration of Twitter into the classroom (DiVerniero & Hosek, 2013). This concern will be explored further based on the mixed-methods research approach.

The fifth item was reported as an issue during the utilisation of Twitter in the learning environment (Lin *et al.*, 2013; Luo & Dani, 2015). Information on Twitter relies on the methods it uses, so posting related information in the wrong places or channels may occur. Thus, this study aims to expand on earlier research by examining this issue and broadening the research and methods used.

The sixth item was identified as a theme of challenges during the integration of Twitter into the classroom (DiVerniero & Hosek, 2013). These issues include internet connections, which are also highlighted in research by Alim (2017). Ultimately, this element is related to barriers that may occur in line with the implementation of Twitter in educational settings. This concern will be explored further based on the mixed-methods research approach.

Item seven was identified and reported as an issue in several studies (Alim, 2017; Grosseck & Holotescu, 2008; Oye *et al.*, 2012; West *et al.*, 2015). Importantly, this element is related to barriers that may occur in line with the implementation of Twitter in a learning setting. This concern will also be further explored based on the mixed-methods research approach.

Item ten was reported as an obstacle during the utilisation of Twitter in the learning environment (Alim, 2017). This was reported in some cases based on academics' comments. Thus, this study aims to expand on earlier research by examining this issue based on students' perspectives.

Table 3.3: References for questionnaire items usage dimensions: The second factor

N	Items	References
1	I do not want to share my private life on social media in school.	(Al-Khalifa & Garcia, 2013; DiVerniero & Hosek, 2013; Fox & Varadarajan, 2011; Grosseck & Holotescu, 2008; Lin <i>et al.</i> , 2013)
2	Twitter has badly affected my study.	(DiVerniero & Hosek, 2013; Grosseck & Holotescu, 2008; Tariq <i>et al.</i> , 2012)
3	Chatting with my friends distracts me during lectures.	(DiVerniero & Hosek, 2013; Fox & Varadarajan, 2011; Grosseck & Holotescu, 2008; West <i>et al.</i> , 2015)
4	I think a lack of experience prevents me from using Twitter effectively	(DiVerniero & Hosek, 2013)
5	Information on Twitter is illogically organised and confusing.	(Lin <i>et al.</i> , 2013; Luo & Dani, 2015).
6	There are accessibility issues on Twitter from time to time.	(DiVerniero & Hosek, 2013)
7	Using Twitter for the study requires too much of my time.	(Alim, 2017; Grosseck & Holotescu, 2008; Oye <i>et al.</i> , 2012; West <i>et al.</i> , 2015)
8	I have a lack of motivation and encouragement from my instructor.	(DiVerniero & Hosek, 2013; Fox & Varadarajan, 2011; Grosseck & Holotescu, 2008; West <i>et al.</i> , 2015)
9	I am intimidated by the use of technology (social media).	(Al-Khalifa & Garcia, 2013; DiVerniero & Hosek, 2013; Fox & Varadarajan, 2011; Grosseck & Holotescu, 2008; Lin <i>et al.</i> , 2013)
10	I do not have sufficient access to the internet.	(Alim, 2017)

3.6.2.5.3 Dimension 3: The disadvantages of Twitter

In this section, the reason for selecting particular items will be discussed along with a presentation of the original sources in Table 3.4.

An overview of the rationale for selecting items related to the disadvantages factor

Here, the reason for selecting particular items will be discussed along with a presentation of the original sources. Items related to this factor are adopted from two studies (Tur & Marín, 2015; West *et al.*, 2015); both research studies were conducted to evaluate the use of Twitter in the learning environment. West *et al.* (2015) evaluated students' utilisation of Twitter for learning purposes. This element was chosen to extend the study and attempt to explaining the growth in the number of tweets. In addition, Tur and Marín (2015) focused on the educational experience of learners utilising Twitter for debate activities in Spain, collecting data from questionnaire and content analysis. The used items were applied to assess the disadvantages of utilising Twitter for learners' participation in debate activities along with their understanding. Thus, it would be beneficial to examine these items in a different country using interviews instead of content analysis.

Table 3.4: References for questionnaire items usage dimensions: The third factor

N	Items	References
1	Twitter was a distraction to learning in the course	(West <i>et al.</i> , 2015)
2	Twitter has inhibited my participation in the debate	(Tur & Marín, 2015)
3	Twitter has not helped me at all to understand the topic and argument in the debate	(Tur & Marín, 2015)
4	Twitter has caused more confusion than understanding	(Tur & Marín, 2015)

3.6.2.5.4 Dimension 4: The positive capacity of Twitter

In this part the reason for selecting particular items will be discussed along with presenting the original sources in Table 3.5.

An overview of the rationale for selecting items related to the positive capacity of Twitter

The fourth elements were chosen from the work of Barczyk and Duncan (2013). The prior research sought students' attitudes and thoughts relating to courses in which Facebook was integrated. In these studies, items were used to assess the thoughts of participants in terms of knowledge sharing, collaboration, and integration. Therefore, it would be worth exploring these in terms of Twitter. Items used in the study are related to students' use of technology and perceptions within their classroom; more importantly, these elements were used and validated by others' prior studies. This also indicate that the roots of these items appear essential to the field. However, this adoption was designed to compare Twitter with Facebook or other types of technology, but rather using items to explore Twitter challenges in students' learning environments.

These items are adopted to assess the positive capacity of Twitter in educational settings.

Table 3.5: References for questionnaire items usage dimensions: The fourth factor

N	Items	References
1	Twitter allows me to find and share educational resources.	(Barczyk & Duncan, 2013; Duncan & Barczyk, 2013)
2	Twitter allows me to communicate with classmates about course-related topics.	(Barczyk & Duncan, 2013; Duncan & Barczyk, 2013)
3	I am encouraged to ask questions.	(Barczyk & Duncan, 2013; Duncan & Barczyk, 2013)
4	My educational needs are being met.	(Barczyk & Duncan, 2013; Duncan & Barczyk, 2013)

3.6.2.5.5 Dimension 5: Engagement

In this section, the reason for selecting particular items will be discussed along with a presentation of the original sources in Table 3.6.

An overview of the rationale for selecting items for engagement

These questions are used by Junco *et al.* (2011) to evaluate the impact of Twitter in student learning and engagement. It is beneficial to evaluate learners' engagement using different research approaches, along with a different country focus.

Table 3.6: References for questionnaire items usage dimensions: The fifth factor

N	Items	References
1	How often do you ask questions or participate in class discussion?	(Junco <i>et al.</i> , 2011)
2	How often do you discuss grades or assignments with an instructor <i>via</i> Twitter?	(Junco <i>et al.</i> , 2011)
3	How often do you discuss ideas from your readings or classes with faculty members outside of class?	(Junco <i>et al.</i> , 2011)
4	How often do you discuss ideas from your readings or classes with others outside of class (students, family members, co-workers, etc.)?	(Junco <i>et al.</i> , 2011)
5	How often do you work with faculty members on activities other than coursework (committees, orientation, student life activities, etc.)?	(Junco <i>et al.</i> , 2011)

3.6.2.5.6 Dimension 6: Pedagogical potential in Higher Education (personalisation)

In this section, the reason for selecting particular items will be discussed along with the presentation of the original sources in

Table 3.7.

An overview of the rationale for selecting items of pedagogical potential in higher education

Three elements were chosen from the work of Barczyk and Duncan (2013). The research sought students' attitudes and thoughts regarding courses in which Facebook was integrated. In these studies, items were used to assess knowledge sharing, collaboration and integration, and learner-centred activates. Therefore, it would be worth exploring these in relation to Twitter. Items used in the study are related to students' use of technology and perceptions of their classroom; more importantly, these elements were used and validated by others' prior studies. This also indicated that the roots of these items appear essential in the field. However, this adoption was not used to compare Twitter with Facebook or other types of technology, but rather used to explore Twitter challenges in students' learning environments.

Table 3.7: References for questionnaire items usage dimensions: The sixth factor

N	Items	References
1	Twitter allows me to share my academic interests.	(Barczyk & Duncan, 2013; Duncan & Barczyk, 2013)
2	Twitter allows me to personalise and express individuality and creativity.	(Barczyk & Duncan, 2013; Duncan & Barczyk, 2013)
3	Twitter allows me to hold forums to discuss topics of my interest.	(Barczyk & Duncan, 2013; Duncan & Barczyk, 2013)

In addition, Table 3.8 exhibits the two open-ended questions used in the questionnaire in order to gain additional information

Table 3.8: References for open-ended questions used in the questionnaire

N	Items	References
1	In your experience, what are the benefits/disadvantages of using these social media tools for your learning and development?	(Dabbagh, Kitsantas, Al-Freih, & Fake, 2015)
2	Do you have any suggestions/recommendations for using social media tools for learning and development?	(Dabbagh <i>et al.</i> , 2015)

3.6.2.6 Piloting the questionnaire

This section describes the pilot study that was applied for the present study. A pilot study is applied for various reasons and it can be based on quantitative and/or qualitative methods (Van Teijlingen & Hundley, 2002). Since this study relies on a questionnaire as the main instrument for collecting quantitative information, the data is collected *via* the use of a questionnaire. Piloting the questionnaire is a fundamental aspect during the research process as the pre-testing of the questionnaire prior to conducting the actual research is an important procedure to boost the level of its success (Cohen *et al.*, 2013). Carrying out the pilot study increases the level of the researcher's confidence in the selected instrument, along with increasing the credibility of obtained data. Therefore, it is worth looking at literature that explore the functions of

questionnaire piloting. Subsequently, it is agreed that piloting study instruments helps to increase reliability, validity, and practicability (Morrison, 1993; Oppenheim, 1992; N. Wilson & McClean, 1994, p. 47). The key functions of piloting, which need to be considered during the pilot period, are as follows:

- To check the clarity of questionnaire items, instructions, and layout;
- To gain feedback on the validity of the questionnaire items, the operationalisation of constructs, and the purpose of the research;
- To eliminate ambiguities or difficulties in wording;
- To check readability levels for the target audience;
- To gain feedback on the type of questions and its formats;
- To gain feedback on response categories for closed questions and multiple-choice items, and to check the appropriateness of specific questions or stems of questions; and
- To check the time taken to complete the questionnaire. Here, the time taken was between 10 and 15 minutes.

According to Van Teijlingen and Hundley (2002), conducting a pilot study may provide researchers with a prior warning in terms of project failure, issues in research protocols or whether the research instrument is inappropriate or too difficult. Furthermore, a pilot study is a crucial source of participants' feedback about the research topic (Otaghsara & Mohseni, 2012). However, it can be argued that a pilot study may have several limitations, such as the potential to make incorrect assumptions or predictions on the basis of pilot data (Van Teijlingen & Hundley, 2002).

Regarding the current questionnaire, its piloting was conducted on a small sample of 24 respondents who completed the questionnaires voluntarily. After completing the pilot study, all previous issues mentioned above were taken into consideration. In addition, the data obtained from the pilot study was analysed using the Statistical Package for Social Science (SPSS) using Cronbach's coefficient alpha to gauge its reliability.

3.6.2.7 Reliability and validity of the questionnaire

This section will focus on the reliability and validity of the research instruments, which is essential for the evaluation of social research (Bryman, 2015). It is agreed that reliability and validity are dissimilar in terms of their concepts. Certainly, the word reliability is about consistency, whereas the word validity is related to truthfulness. Carmines and Zeller (1979, p. 12) acknowledge that 'while the reliability focuses on a particular property of empirical indicators ... validity concerns the crucial relationship between concept and indicator'. In addition, according to Bryman (2015),

measurement validity is related to reliability. To reiterate this connection, if a measure of a concept is an unreliable indicator it can produce unstable and fluctuating results, and, therefore, cannot produce a valid measure of the concept in the study. Thus, it is supposed that a reliability test should be conducted prior to a validity test. A further related point is that even though the indicator is reliable, this does not guarantee the validity of the indicator (Carmines & Zeller, 1979). Therefore, the common procedure is assumed to evaluate both terms (reliability and validity) in a pilot study to determine the validity and reliability of applied instruments and avoid producing misleading information during the actual implementation of the study. Having set the scene, the following sections undertake an in-depth discussion of these terms.

3.6.2.7.1 Reliability

In the quantitative field, there is concern related to the stability of the measure when the outcomes of the research are repeatable. Reliability is a common word in the research field, so providing its meaning is a primary step. Hammersley (1992, p. 67) defines reliability as ‘... the degree of consistency with which instances are assigned to the same category by different observers or by the same observer on different occasions’. Reliability is also defined as ‘the accuracy and precision of the measurement and the absence of differences if the research were repeated’ (Collis & Hussey, 2014, p. 52). Reliability clearly shows the consistency of a measure of a concept. Therefore, having reliable research results means that recurring research by different people should provide similar findings (Collis & Hussey, 2014).

To measure the reliability of the current research, it appears that there are several methods to consider. One of these is known as internal reliability (Bryman, 2015), which the present study will focus upon and apply. Since reliability deals with consistency (whether this consistency is over time or amongst items), this consistency can be measured in several ways, such as the test-retest, the split half method, or internal consistency reliability.

Measuring reliability can be approached *via* applying one method of testing. Although using particular methods to assess reliability gives the researcher adequate confidence, some of these methods appear to have some limitations. For instance, according to Carmines and Zeller (1979), repeating the measurements cannot be precisely the same and unreliability is constantly present, at least to some extent. Consequently, the high level of consistency produced by repeating the measurements indicates higher reliability and vice versa. More issues regarding this type of measure can be seen on test-retest reliability, which may produce flawed results as the respondent’s prior experience in the initial testing affects the second testing (Carmines & Zeller, 1979). In this case, alternate-form reliability may be introduced, utilising different worded statements (a different version of test) to measure the same test (Fink & Litwin, 2003).

A further procedure, known as the split half method, is used to assess internal reliability. This procedure has various techniques in which items can be categorised into two groups, which may cause the indeterminacy of reliability. For example, the correlation obtained from the first and second group test is likely to differ from the correlation obtained from the odds and evens test (Carmines & Zeller, 1979).

A final and more effective method of measuring internal consistency is to use Cronbach's alpha. This method takes the correlation of all items on the scale, which is symbolised as alpha (α) (Cronbach, 1951). This test is still used by most researchers. The growth in use of Cronbach's alpha is probably due to the integration of computer software in quantitative analysis (Bryman, 2015). Thus, the current research is gauging the reliability of the questionnaire by using Cronbach's alpha.

Cronbach's alpha is a widely used test for gauging internal reliability. Essentially, the score varies between 1 (indicating perfect internal reliability) and 0 (indicating no internal reliability) (Bryman, 2015). A score of 0.80 is generally applied as a rule of thumb to indicate 'an acceptable level of internal reliability' (Bryman, 2015, p. 158). Nonetheless, many researchers accept a figure that is slightly lower than 0.80 (Bryman, 2015).

SPSS was used to measure the internal reliability of the questionnaire (pilot study). The internal reliability of the pilot study was approved by the Cronbach's alpha scale, gaining a score of 0.930, which is considered to be very high. The consistency across the items of dimensions was reliable. The results are shown in Table 3. 9.

The internal reliability of the main study is reported in analysis chapter in Table 4.10

Table 3. 9: Exhibiting the reliability coefficient analysis scale 'alpha' of each dimension

N	Dimensions	Cronbach's alpha (coefficient)
1	What is your skill level in using computer programs and applications?	.807
2	Usefulness	.868
3	Engagement and understanding	.902
4	Obstacles	.900
5	All dimensions	.930

3.6.2.7.2 Validity

After establishing the reliability of the research method, the following step evaluates its validity. Validity is a crucial element in any research, and so understanding this view is a significant step in producing successful information. The common notion about validity relates to whether the measure of the concept truly measures that concept (Bryman, 2015). Regarding its definition, validity refers to ‘the extent to which a test measures what the researcher wants it to measure and the result reflects the phenomena under study’ (Collis & Hussey, 2014, p. 53). In other words, validity refers to ‘the issue of whether an indicator (or set of indicators) that is devised to gauge a concept really measures that concept’ (Bryman, 2015, p. 158). A simple further description is that validity is the ‘ability to measure what is intended to be measured’ (Klassen *et al.*, 2015, p. 555). Prior definitions indicate that producing invalidated measures leads to uncertain information. It is worth determining that there are two general types of validity – internal and external validity (Roberts, Priest, & Traynor, 2006). The emphases in these categories are different; first, external validity encompasses ‘the ability to apply, with confidence, the finding of the study to other people and other situations’ (Roberts *et al.*, 2006, p. 43). The aim of the present research is to apply a questionnaire to a representative sample of undergraduate students at the Universities in Saudi Arabia in a natural setting. Second, internal validity seeks to ‘demonstrate that the explanation of a particular event, issue, or set of data, which a piece of a research provides can actually be sustained by the data’ (Cohen *et al.*, 2013, p. 183). In other words, the results have to precisely describe the area being investigated. In this context, the questionnaire should be comprehensive and accurate to measure the area of the investigation fairly. However, even though the process of validity that the instrument needs to undertake to increase its truthiness for measuring an area of investigation, it is sometimes not possible to own research with 100% validity (Cohen *et al.*, 2013). Hence, the present research attempts to maximise validity and minimise invalidity by undergoing validity procedures.

According to the literature, there are various ways to measure validity, and they are distinguished by researchers including face validity, content validity, predictive validity, construct validity, and convergent validity (Bryman, 2015; Cohen *et al.*, 2013). These measures will be discussed in the next section along with the selected research instrument: the questionnaire.

3.6.2.7.2.1 Face and content validity of the questionnaire

Face validity implies the degree to which an instrument appears to measure what is supposed to measure (Gay, Mills, & Airasian, 2012). For assessment, this type of validity the questionnaire can simply be given to knowledgeable individuals to check whether the items look reasonable, focusing on a more casual assessment of the items’ appropriateness (Fink & Litwin, 2003). This

method of validation is often utilised as an initial screening technique, followed by content validity (Gay *et al.*, 2012). Content validity ‘is a subjective measure of how appropriate items or scales seem to a set of reviewers who have some knowledge of the subject matter’ (Fink & Litwin, 2003, p. 33). This type of procedure undertakes an organised and planned review of the questionnaire’s statements to ensure that it encompasses all related facets of the concept, which include needed and exclude unneeded items (Fink & Litwin, 2003).

Both face and content validity are not statistically measured. Therefore, to obtain face and content validity, the questionnaire was first constructed after reviewing the existing literature relating to similar concepts ([construction of the questionnaire](#)). It was reported that using pre-existing questions has implications in relation to the validity of data (Campbell & Stanley, 1963, cited in Hyman, Lamb, & Bulmer, 2006). Next, the questionnaire was reviewed by an academic supervisor who is an expert in the field. It was then given to some colleagues with an education background, particularly in the field of educational technology, to obtain their opinion in relation to two main aspects: first, to determine whether the measure appears to fairly reflect the concept, and second, to determine whether the instrument covers and represents the items or domains of the investigation.

This procedure is also recommended by Taherdoost (2016), who states that approaching content validity is established through a review of related literature, afterwards the instrument needs to be assessed by experts or panels. This type of validity is significant to research, which is designed to gauge particular respondents’ knowledge in a selected area (Eby, 1994). In addition, there are two more steps that helped to validate the research instrument: the pilot of the questionnaire and the process of translation, as these assess the research to check the appearance of the instruments and whether the questionnaire collected the required data.

In summary, these various types of validity depend on subjective judgments rather than a statistical perspective (Stangor, 2011; Taherdoost, 2016). Thus, even though these forms of validity are important, they may not be sufficient to ensure the overall validity of a research instrument. The next form of validity involves a more statistical perspective.

3.6.2.7.2.2 Construct validity

In addition to prior forms of validity, this section describes construct validity and how it was approached in the current research. Construct validity refers to ‘the extent to which a measured variable actually measures the conceptual variable (that is, the construct) that it is designed to assess’ (Stangor, 2011, p. 95). According to Cohen *et al.* (2013) and Taherdoost (2016), there are two components of this form: convergent and discriminant validity. Convergent validity refers to

‘the extent to which a measured variable is found to be related to other measured variables designed to measure the same conceptual variable’ (Stangor, 2011, p. 96). In other words, convergent validity is established when two related items or elements of selected concepts are associated with each other, often approached *via* a test such as correlation, regression, or factor analysis (Cohen *et al.*, 2013). By contrast, discriminant validity refers to ‘the extent to which a measured variable is found to be unrelated to other measured variables designed to measure other conceptual variables’ (Stangor, 2011, p. 96). Explained differently, discriminant validity (divergent) is established when two or more elements or items are not related or different from each other; the approach is often *via* the use of a difference-test such as the t-test or analysis of variance (Cohen *et al.*, 2013).

Assessing construct validity can be approached in several ways, including factor analysis using principle components (Muttar, 1984; Soo Wee & Quazi, 2005; D. W. Straub, 1989). In the current study, factor analysis has been demonstrated through the utilisation of exploratory factor analysis.

Essentially, the assessment of construct validity can be approached through establishing factorial validity (Bagozzi, 1980). Factorial validity assesses both discriminant and convergent validity *via* the utilisation of factor analytic procedures, such as exploratory factor analysis and principal component analysis (D. Straub, Boudreau, & Gefen, 2004). Convergent and discriminant analysis are determined by factor loading, ensuring that cross-items are deleted. Items or elements load precisely on a factor (construct) on which they are supposed to load rather than on other factors (constructs) on which they are not supposed to load (D. Straub *et al.*, 2004). In other words, all items loaded are required to be above 0.40 in a single construct, noting that items cross loading above 0.40 should be dropped. Thus, factor analysis results will meet the criteria of construct validity for both convergent and discriminant validity. For instance, in relation to convergent validity, the results should be ‘eigenvalues of 1, loading of at least 0.40, items that load on posited constructs’, whereas in discriminant validity the results should be ‘loading of at least 0.40, no cross-loading of items above 0.40’ (Taherdoost, 2016, p. 32). The results of the exploratory factor analysis for this study are presented in the analysis chapter, indicating that questionnaire is validated according to construct validity assumption.

3.6.3 Interviews

Talking to people is a crucial method of gathering their perceptions on how they understand the world and their lives. Having conversations leads to understanding people's experiences, hopes, and feelings (Kvale, 2007). An interview is a method for collecting data that allows more than one sensory channel to be applied, such as spoken, heard, verbal, and non-verbal. Therefore, using an interview in research is a powerful tool for investigators as the information can be gathered *via* more than a single sense (Cohen *et al.*, 2013). According to Cohen *et al.* (2013, p. 411), a research interview is defined as 'a two-person conversation initiated by the interviewer for the specific purpose of obtaining research-relevant information and focused by him on content specified by research objectives of systematic description, prediction or explanation'. An additional definition is that 'an interview is a data collection method in which an interviewer asks questions of an interviewee' (B. Johnson & Christensen, 2008, p. 203). The interview is more than just a chat; it is a planned and well-organised communication that encompasses comprehensive attention through questioning and listening (Kvale, 2007). An interview can be conducted in various ways, such as in person (face-to-face), a telephone interview, or an online interview (*via* the internet) (B. Johnson & Christensen, 2008). A face-to-face interview is used in this study.

Even though interviews are sometimes used to collect quantitative data, they are often used for gathering qualitative data in educational research (Atkins & Wallace, 2012; Cohen *et al.*, 2013). An interview can be a very flexible research tool for collecting various types of information, such as views, opinions, and individuals' narratives; therefore, it is an ideal way to address an extensive range of research questions (Atkins & Wallace, 2012). Furthermore, according to Cohen *et al.* (2013), there are several and various purposes of applying a research interview, such as to assess or evaluate an individual in some respect or to sample respondents' opinions. Practically, an interview is conducted to gather information about the thoughts of an individual, and can gauge what an individual is aware of, i.e. knowledge or information, what an individual dislike or likes, i.e. preferences and values, and what an individual believes, i.e. beliefs and attitudes. Moreover, an interview allows researchers to check and clarify any misunderstood concepts that may arise while the conversation takes place (Atkins & Wallace, 2012).

Interviews can be conducted on their own or in conjunction with other methods in a single investigation. An interview may be used to follow up unexpected results or to seek in-depth details (Kerlinger, 1970). Oppenheim (1992) suggests that in contrast to a questionnaire, an interview is better for dealing with more complicated and open-ended questions.

As far as the interview is concerned, encouraging interviewees to speak may provide valuable judgements and insights into their thoughts, so accurate data might be obtained, although it is important to consider the various types of bias that may creep in while the interviewee is

encouraged to participate. During the translation and interpretation of the interview, there is a high possibility of bias. This concern has to be managed and controlled well (Arthur, 2012).

For the purpose of this research, the interview is used to gain in-depth details to enrich the answers to the research questions. The researcher has chosen the semi-structured interview method, which provides qualitative data. This type of interview gives the interviewee a degree of freedom and flexibility to speak without any influence from the investigator in terms of what to say. Semi-structured interviews give researchers in-depth answers that are derived from the interviewee's perspective and experiences (Clifford, Cope, French, & Gillespie, 2016; Cohen *et al.*, 2013). Thus, the semi-structured interview provides an insight into how participants experience the use of Twitter in relation to their learning environment as participants' opinions, thoughts, and experiences are vitally important to further explanations.

Another rationale behind choosing a semi-structured interviews is that it is more suitable for the second phase of qualitative research. It is directed primarily towards an additional explanation of the findings obtained from the first phase of the research. Compared to an unstructured interview, the scope of information needed in a semi-structured interview appears obvious to the researcher, as some questions relate to the results of the questionnaire. Consequently, the semi-structured interview seems to be the most appropriate type. In the current study, the interview procedure is applied to collect qualitative data during a follow-up stage.

Even though the semi-structured interview is very beneficial in creating rich data that may not otherwise be possible to gain *via* the use of a questionnaire, its conduction and analysis is time-consuming and includes translation into or from a different language (Arabic).

3.6.3.1 Conducting semi-structured interviews

The research interview is a conversation for which the design and structure are determined by the researcher (Kvale, 2007), as opposed to normal daily conversations, which are not necessarily pre-planned. To reiterate, research interviews differ fundamentally from daily interactions, because they are scheduled prior to commencing the actual event, rather than occurring by chance (Kvale, 2007; Oates, 2006). Semi-structured interviews are often scheduled in advance at a designated time. They are typically formulated around a set of predetermined open-ended questions, which are sometimes referred to as an interview guide, with other questions emerging during the conversation between the investigator and the interviewee, during which the interviewee has the freedom to respond as they wish (Bryman, 2015; Clifford *et al.*, 2016). The interviewee may not be questioned exactly as outlined in the schedule (Bryman, 2015; Clifford *et al.*, 2016). Semi-structured interviewers are more likely to begin their interview with a fairly clear

focus to address more specific issues than the very broad concept of a research topic (Bryman, 2015).

It is advised that after conducting the interview, several notes should be made. For instance (Bryman, 2015, p. 472):

- How the interview went (talkative, nervous, cooperative);
- The location of the interview;
- Any other feelings about the interview (new avenues of interest); and
- The setting (quiet, busy).

The present study is based on mixed-methods research, which combines both quantitative (a questionnaire) and qualitative (a semi-structured interview) instruments to collect the data. Both instruments are used to answer the research questions. A semi-structured interview is a suitable method for collecting more information to explain and support results that are discovered after analysing the main method, i.e. the questionnaire.

Table 3.10: Summary of research questions and data sources

N	Research questions	Data sources
1	To what extent do students find challenges of integrating Twitter in a learning environment beneficial/detrimental and how?	Questionnaire Semi-structured interview
2	What are the perceived obstacles to integrating social media (Twitter) in educational disciplines?	Questionnaire Semi-structured interview
3	What are the perceived disadvantages of integrating Twitter into educational disciplines?	Questionnaire Semi-structured interview
4	To what extent do students perceive that using Twitter has a positive capacity within their learning environment?	Questionnaire Semi-structured interview
5	To what extent do students engage <i>via</i> social media (Twitter) for educationally relevant purposes?	Questionnaire Semi-structured interview
6	To what extent do students believe social media (Twitter) offers pedagogical potential in their learning environment?	Questionnaire Semi-structured interview

3.7 Ethical considerations

Ethical issues associated with the present study were considered fully and the researcher followed the standards advised by Durham University in terms of reliability and credibility. Before the conduct of the field work, the researcher considered several ethical aspects with reference to Durham University, the Saudi Culture Bureau in London, and the University of Hail.

3.7.1 Before the empirical work commenced

3.7.1.1 Durham University

Permission for the study was sought from Durham University's ethics committee. This was achieved *via* the provision of the research proposal, including full details about the research methods and tools. The researcher's awareness in relation to cautiously considering ethical issues was highlighted and emphasised. The researcher endeavoured to comply with and follow the standards advised by the university, which led to the study being approved by the ethical committee (see Appendix A).

3.7.1.2 The place where the empirical research was conducted

To gain full access and permission from the participating university, the researcher provided information and a full explanation for the university and for people who wanted to know about the study, including policy makers, academic faculties, and participants; the information described the purposes and objectives of the study along with the type of data to be collected. This procedure was achieved in two phases; first, the researcher verbally communicated with the stakeholders and then in written form, encompassing all related papers such as questionnaires, the potential of the interviews, and the permission of Durham University's ethical committee.

The permission of the Saudi Culture Bureau in London was sought to gain access to the university and gain its approval and support.

Ultimately, the researcher was given full access to the participating university with no restrictions regarding using the institution's name, along with permission from the Saudi Culture Bureau in London to leave the UK and collect the needed data (see Appendix B).

3.7.2 During the study

Before commencing the actual study, researcher repeatedly explained the purpose of the study to the participants in detail; the researcher also stressed that participation was voluntary and

acknowledged that there was no potential risk in participating and that participants could withdraw from the study at any time.

Regarding the completion of questionnaires, the cover paper provided information about the study, such as its purpose, estimated duration, and types of questions. It also reassured participants that there were no identifying questions and explained their right to withdraw from the study at any time. It reminded them of the importance of responding to the survey questions honestly to ensure the study's validity. Thereafter, a statement was written to confirm their approval: 'If you are happy to participate, press the button accepted'. On the cover sheet, the following points were made clearly.

- Participants have the right to withdraw at any time;
- Participants responses and identities will remain confidential; and
- Participants can be informed of the study outcomes once it is completed by emailing the researcher at the given email address.

Interviewees were informed about the purpose of the interview along with the devices used to record their interview. Confidentially, interviewees were not required to provide any personal details, such as their names or ID during the interview conversation. They were assured that their identity would not be revealed and any excerpts quoted would remain anonymous. Subsequently, participants were given the 'Declaration of Informed Consent' to read and sign to confirm their acceptance. Participants were given the right to withdraw from the interview at any time and/or terminate their participation.

Participants were also informed (orally and on the cover sheet) that no one else would have access to their data and all data collected during the study would be destroyed once the study was complete.

Chapter 4: Quantitative data analysis and results

4.1 Introduction

This chapter presents the quantitative (questionnaire) only. It introduces the analysis of the main instrument (the questionnaire). The data derived from the questionnaire were analysed *via* the Statistical Package for Social Science (SPSS). The questionnaire embraced seven main sections as follows: demographics, challenges, obstacles, disadvantages of Twitter, positive capacity of Twitter, engagement, and pedagogical potential in Higher Education. These dimensions are summarised and presented in tables and graphics format. The target of this project is undergraduate students, with a total of 144 completed questionnaires.

The respondents are full-time students (males) who are studying an undergraduate academic degree at the University of Hail in Saudi Arabia. Moreover, all the participating students use Twitter in their learning.

4.2 The percentage of questionnaires suitable for use

The present study applied a questionnaire by means of a computer-delivered method (online), using the Bristol online survey tool (BOS). Conducting and designing an online survey resulted in having questionnaires without missing data because all the questions were required before submitting the completed questionnaire.

The target of the study was around 186 students who used a Twitter account. However, the number of submitted questionnaires was only 144, as shown in Table 4.1. Consequently, all submitted questionnaires were suitable for use.

Table 4.1: Number of classes, students and submitted questionnaire

N	Classes	Number of all students in the classes	Number of students in the classes using Twitter	Number of all students completed the questionnaire
1	8	201	186	144

4.3 The application of statistical analysis procedures

As discussed in the previous chapter, this study adopted a mixed-method approach. This means that the main sources of data will be both quantitative and qualitative. However, this section focuses on the quantitative data analysis obtained from the questionnaires. Before discussing the data analysis procedures and statistical tests, it is necessary to explore the statistical literature to be able to choose the appropriate analysis procedure and statistical test and to develop analysis skills using SPSS and Microsoft Excel. Fundamentally, it is important to indicate that statistical data analysis relies on the number and types of variables (dependent or independent), the level of measurements (nominal, ordinal, and ratio scale) and the purpose of the analysis (research questions, hypothesis). In addition, the types of tests utilised in the research are highly dependent on whether the test works with parametric or non-parametric data (Allen & Seaman, 2007; Bettany-Saltikov & Whittaker, 2014; P. Y. Chen & Popovich, 2002; Fisher & Marshall, 2009; Greasley, 2007; Harpe, 2015; Larson-Hall, 2015; Marshall & Jonker, 2010; McCrum-Gardner, 2008; Neideen & Brasel, 2007; C. B. Thompson, 2009; Trajkovski, 2016).

In this section, data are mainly derived from questionnaires, wherein Likert scales are used to address research phenomena along with categorical data (nominal) to provide demographic data. According to Allen and Seaman (2007), Jamieson (2004), and McCrum-Gardner (2008), Likert scales are more likely to be placed within the ordinal level of measurement; therefore, nonparametric methods are the appropriate choice, such as the Spearman rho coefficient for correlation and Mann Whitney for the differences (Bettany-Saltikov & Whittaker, 2014; Trajkovski, 2016)

In terms of descriptive analysis and Likert scales, there are widely published studies including the literature from which the current questionnaire constructed its items, used frequency distribution, means and standard deviation, and analysis to present its findings (Barczyk & Duncan, 2013; Duncan & Barczyk, 2013; Junco et al., 2011; West et al., 2015). Therefore, the current descriptive analysis used frequency, mean, standard deviation, percentages, and the total number of agreement and disagreement to facilitate the interpretation of the questionnaire data. Quantitative data analysis procedures are presented in Table 4.2 and Table 4.3

The statistical analysis procedure and test are presented in Figure 4.1

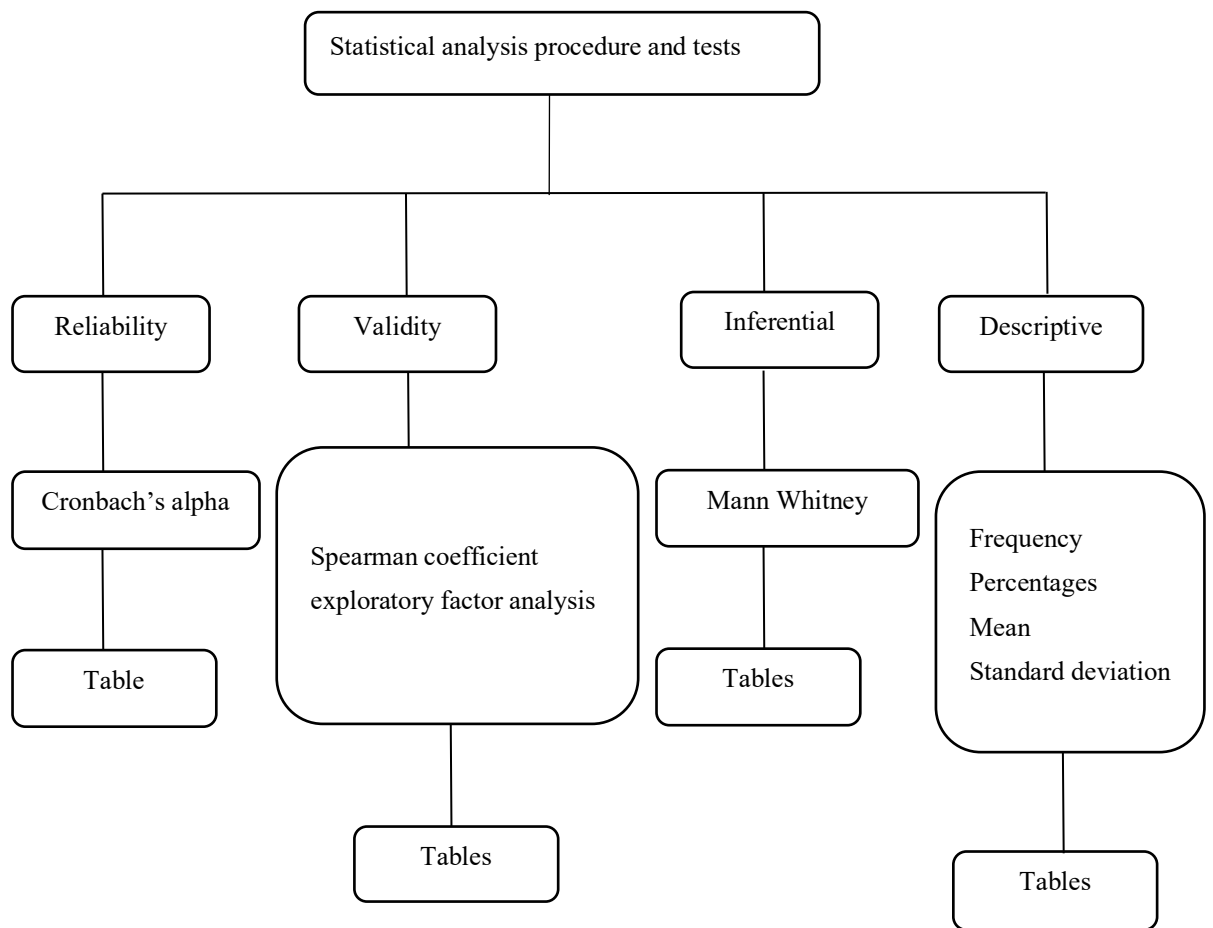


Figure 4.1: Statistical analysis procedure and tests

Table 4.2: Quantitative data analysis procedures (descriptive type)

N	Research question	Statistical type/test	Results presentation
1	Demographic data	Descriptive	Tables or Figures within Frequencies, Percentages, Mean and Standard Deviation besides
2	To what extent do students find Twitter's functions are useful in their learning environment?	Descriptive	Tables within Frequencies, Percentages, Mean and Standard Deviation
3	To what extent do students find challenges of integrating Twitter in a learning environment beneficial/detrimental and how?	Descriptive	Tables, Frequencies, Percentages, Mean and Standard Deviation
4	What are the perceived obstacles to integrating social media (Twitter) in educational disciplines?	Descriptive	Tables, Frequencies, Percentages, Mean and Standard Deviation
5	What are the perceived disadvantages of integrating Twitter into educational disciplines?	Descriptive	Tables, Frequencies, Percentages, Mean and Standard Deviation
6	To what extent do students perceive that using Twitter has a positive capacity in their learning environment?	Descriptive	Tables, Frequencies, Percentages, Mean and Standard Deviation
7	To what extent do students engage <i>via</i> social media (Twitter) for educationally relevant purposes?	Descriptive	Tables, Frequencies, Percentages, Mean and Standard Deviation
8	To what extent do students believe social media (Twitter) offers pedagogical potential in their learning environment?	Descriptive	Tables, Frequencies, Percentages, Mean and Standard Deviation

Table 4.3: Quantitative data analysis procedures (inferential type)

N	Research hypothesis	Statistical type/test	Results
1	Is there a statistically significant difference in the responses to the challenges of using Twitter in terms of the variable: prior online experience? H0: There are no differences in responses to the challenges between students who had prior online experiences and students who had not.	Mann Whitney U test	Table
	Is there a statistically significant difference in responses to the challenges in terms of the variable: prior Twitter academic experience? H0: There are no differences in challenges between students who had prior Twitter academic experience and students who had not.		
	Is there a statistically significant difference in the challenges in terms of the variable: frequency (Rarely and More than five times a day)? H0: There is no difference in the challenges between students who use Twitter rarely (less than once a day) and students who use Twitter more than five times a day.		
2	Is there a statistically significant difference in the perceived obstacles in terms of the variable: prior online experience? H0: There are no differences in the perceived obstacles between students who had prior online experiences and students who had not.	Mann Whitney U test	Table
	Is there a statistically significant difference in obstacles in terms of the variable: prior Twitter academic experience? There are no differences in obstacles between students who had prior Twitter academic experience and students who had not.		
3	Is there a statistically significant difference in the disadvantage of Twitter in terms of the variable: prior online experience? H0: There are no differences in disadvantage of Twitter between students who had prior online experiences and students who had not.	Mann Whitney U test	Table
	Is there a statistically significant difference in disadvantage of Twitter in terms of the variable: prior Twitter academic experience? There are no differences in disadvantage of Twitter between students who had prior Twitter academic experience and students who had not.		
4	Is there a statistically significant difference in the Positive capacity in terms of the variable: prior online experience? H0: There are no differences in positive capacity between students who had prior online experiences and students who had not.	Mann Whitney U test	Table
	Is there a statistically significant difference in positive capacity in terms of the variable: prior Twitter academic experience? There are no differences in positive capacity between students who had prior Twitter academic experience and students who had not.		
5	Is there a statistically significant difference in the engagement in terms of the variable: prior online experience? H0: There are no differences in engagement between students who had prior online experiences and students who had not.	Mann Whitney U test	Table
	Is there a statistically significant difference in engagement in terms of the variable: prior Twitter academic experience? There are no differences in engagement between students who had prior Twitter academic experience and students who had not.		
6	Is there a statistically significant difference in pedagogical potential of Twitter in higher education in terms of the variable: prior online experience? H0: There are no differences in pedagogical potential of Twitter in Higher Education between students who had prior online experiences and students who had not.	Mann Whitney U test	Table
	Is there a statistically significant difference in pedagogical Potential of Twitter in Higher Education in terms of the variable: prior Twitter academic experience? There are no differences in pedagogical potential of Twitter in Higher Education between students who had prior Twitter academic experience and students who had not.		

4.4 Measurement scale

In this research, data were obtained from the questionnaire, wherein the Likert scale format (ordinal level of measurement) was utilised. To report and analyse general characteristics of the respondent and variables, as well as assess the attitudes and experiences of students in relation to regarding to each item, a standard interval was required (see Table 4.4). Therefore, the standard interval was generated by conducting the following formula (Fernandez, 2013):

$$\text{Standard interval of Likert scale} = \frac{\text{Maximum scores} - \text{Minimum scores}}{\text{Number of scores}} = \frac{5-1}{5} = \frac{4}{5} = 0.80$$

Table 4.4: Utilised scale to explain the means

N	Measurement scale	Score
1	Strongly disagree/Not skilled/Never	From 1.00 to 1.80
2	Disagree/Slightly skilled/Rarely	From 1.81 to 2.60
3	Neither agree nor disagree/Somewhat skilled/Sometimes	From 2.61 to 3.40
4	Agree/Skilled/Often	From 3.41 to 4.20
5	Strongly agree/Very skilled /Very often	From 4.21 to 5.00

4.5 Demographic analysis of participants' background characteristics

This section focuses on presenting the demographic data in order to provide information related to participants' background. The demographic data is the initial part of the questionnaire, including age, academic year, technical skills, web applications experience, prior course online experience, and prior academic Twitter experience. This information provides overview details related to the research sample, which can also be used to control other factors within the study. The data are presented as tables or figures includes all, or some, frequencies, percentages, mean, weighted average, and standard deviation. The data in this section are derived merely from the questionnaire.

4.5.1 Distribution of participants according to their age

Figure 4.2 presents the distribution of participants according to their age. It is clear that the majority of participants (103) were in the age group 22 to 25 (71.5%) with the second greatest number being 34 (23.60%) in the 18 to 21 age group. Moreover, five (3.50%) respondents were in the age group 26 to 29, while merely two (1.40%) participants were older than 30 years.

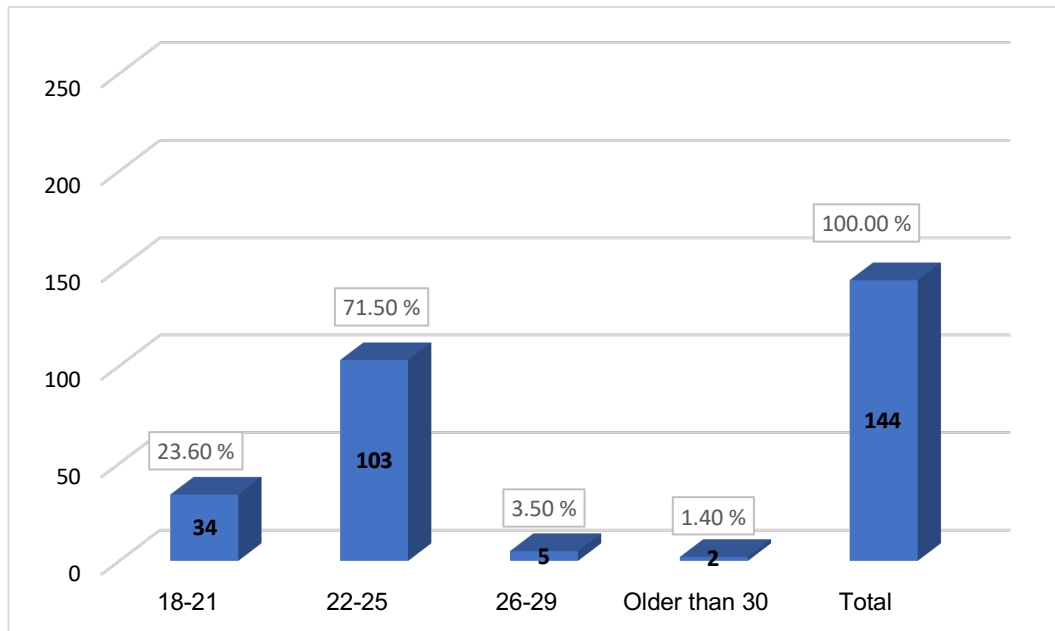


Figure 4.2: Distribution of age

4.5.2 Distribution of participants according to academic year groups

Students were asked to indicate their academic year; as shown in Figure 4.3 the total of respondents is 144 (100%). It appears that they were not in the same academic year groups. Here, we found that the largest number of participants were placed in the third and fourth academic years with 53 (36.80%) and 41 (28.50%), respectively. However, there were merely 13 (9.00%) respondents in the first academic year and 37 (25.70%) in the second academic year.

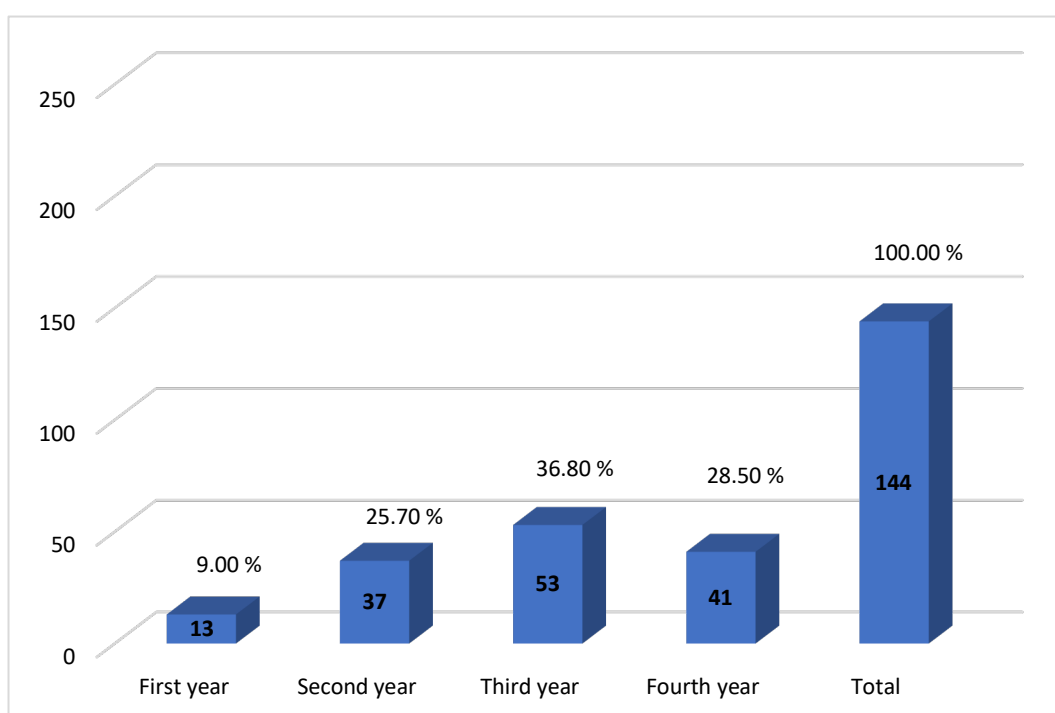


Figure 4.3: Distribution of academic year

4.5.3 Distribution of participants according to technical skills

Students were asked to evaluate their own technical skills. Table 4.5 demonstrates the mean, rank, frequencies, and percentages of students' technical skills associated with computer and internet applications. Those skills (items) were given a rank column in descending order according to their mean (M). The table clearly shows that WhatsApp had the highest items mean (M=4.66 SD=0.79). The percentage of 'very skilled' for this item is 79.00%, which is the largest percentage among very skilled items, whilst 'creating web pages' (M=1.91 SD=1.19) was the lowest items mean, within the percentage of 'very skilled' items at 4.20%, which is the lowest percentage among the 'very skilled' items.

Table 4.5: Technical skills

N	Items		Very skilled	Skilled	Somehow skilled	Slightly skilled	Not skilled	Mean	Std. dev.	Rank
1	E-mail	F	27	53	34	24	6	3.49	1.10	8
		%	18.8	36.8	23.6	16.7	4.2			
2	Instant messenger	F	78	48	12	5	1	4.37	0.83	6
		%	54.2	33.3	8.3	3.5	0.7			
3	Web surfing	F	80	45	15	3	1	4.39	0.81	5
		%	55.6	31.3	10.4	2.1	0.7			
4	Presentation software (PowerPoint)	F	9	46	43	36	10	3.06	1.05	9
		%	6.3	31.9	29.9	25.0	6.9			
5	Graphics design application (Photoshop)	F	7	18	25	45	49	2.23	1.19	12
		%	4.9	12.5	17.4	31.3	34.0			
6	Creating web pages	F	6	14	17	31	76	1.91	1.19	13
		%	4.2	9.7	11.8	21.5	52.8			
7	Learning management system (Blackboard)	F	12	17	42	37	36	2.53	1.22	11
		%	8.3	11.8	29.2	25.7	25.0			
8	Facebook	F	17	32	24	28	43	2.67	1.41	10
		%	11.8	22.2	16.7	19.4	29.9			
9	Twitter	F	84	31	19	9	1	4.31	0.97	7
		%	58.3	21.5	13.2	6.3	0.7			
10	Snapchat	F	108	22	9	4	1	4.61	0.79	2
		%	75	15.3	6.3	2.8	0.7			
11	Instagram	F	101	24	12	5	2	4.51	0.89	3
		%	70.1	16.7	8.3	3.5	1.4			
12	YouTube	F	97	29	12	6	0	4.51	0.82	3
		%	67.4	20.1	8.3	4.2	0.00			
13	WhatsApp	F	114	18	7	3	2	4.66	0.79	1
		%	79.2	12.5	4.9	2.1	1.4			
		F	144	The average mean for technical skills is (M=3.36)						
		%	100							

The information in the table indicates that the four highest means are social media applications, including WhatsApp. These are presented according to their ranks: Snapchat (M=4.62 SD=0.79), YouTube (M=4.51 SD=0.82), and Instagram (M=4.51 SD=0.89). The frequency number of 'very skilled' for the four previous social media applications was between (114 and 97) and the

frequency of 'not skilled at all' was between 0 and 2. Twitter was ranked as the seventh item ($M=4.31$ $SD=0.97$) among 84 (58%) students, who were very skilled and only one participant (4.20%) was not skilled at all.

Surprisingly, unlike social media, skills relating to e-mail and the learning management system (Blackboard) were ranked at 8 and 11, respectively.

In general, the overall mean of students' technical skills is 'somehow skilled' ($M=3.36$). The average mean of students' social media skills (WhatsApp, Twitter, Instagram, YouTube, Facebook, and Snapchat) is 'very skilled' ($M=4.21$). Therefore, students are likely to be more proficient in social media tools than other technical skills.

4.5.4 Distribution of participants' experiences of taking fully online courses

Table 4.6 lists the frequencies and percentages of students' experiences in relation to their prior undertaking of fully online courses; nearly a fifth of respondents, (22 [15.30%]), had taken a fully online course, whilst 122 (84.70%) participants had not.

Table 4.6: Online courses

Answer		Frequency	Proportion
Valid	Yes	22	15.3
	No	122	84.7
	Total	144	100.0

4.5.5 Distribution of participants owning electronic devices

Respondents were asked to report what sort of electronic devices they owned. Figure 4.4 demonstrates that most devices used by students were Smartphones at 134 (93.10%), followed by personal laptop computer at 59 (41.00%). Personal desktop computers, gaming consoles, and iPad were owned by a few participants: 23 (16.00%), 19 (13.20%) and 15 (10.40%), respectively, whereas E-book readers were not owned by any participants (0.00%).

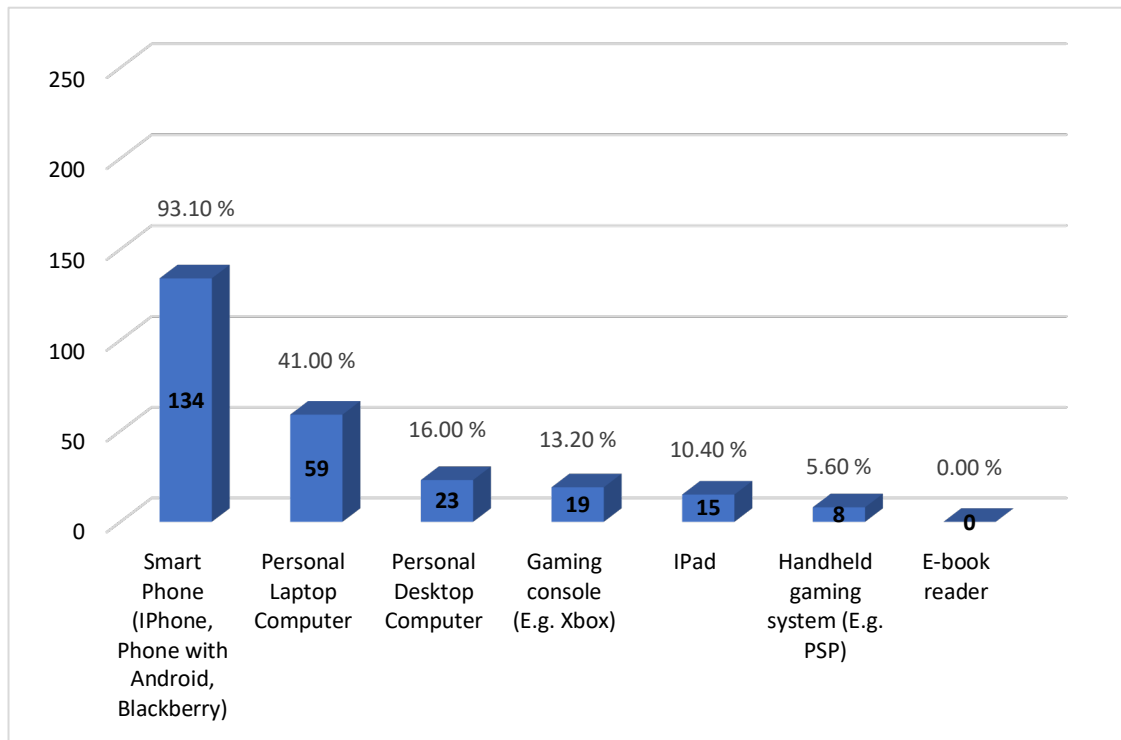


Figure 4.4: The electronic devices owned by students

4.5.6 Distribution of the frequency of participants' use of Twitter in daily life

Students were asked to report on their frequency of Twitter use daily. Figure 4.5 shows that the majority of participants (45 [31.30%]) used Twitter 'more than five times a day'. The next group of participants used Twitter 'once a day' at 28 (19.40%), followed by 'two to three times a day' at 26 (18.10%). Only two participants did not use Twitter on a daily basis.

A closer look at Figure 4.5 indicates that 122 (84.80%) students used Twitter at least once a day or more.

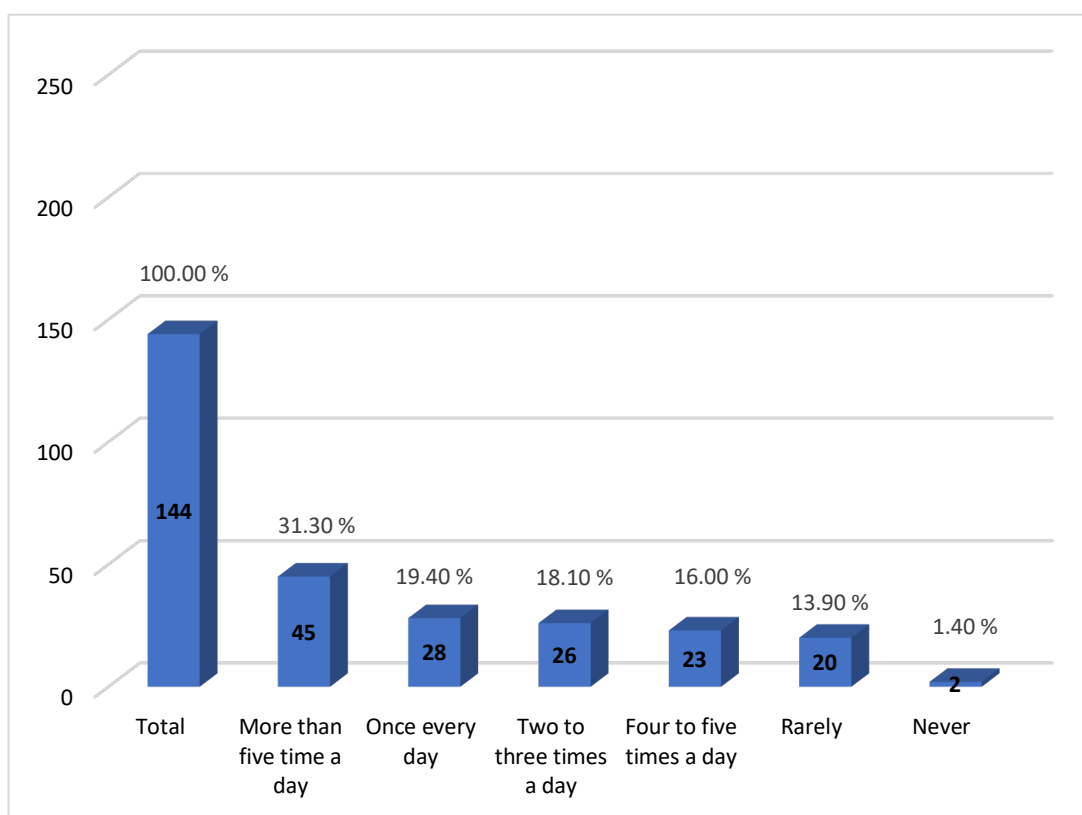


Figure 4.5: The frequency of Twitter uses on a daily basis

4.5.7 Distribution of participants' prior Twitter academic experience in relation to academic courses

Students were asked to report whether they had previous Twitter academic experiences or not. What is interesting regarding the data in Table 4.7, is that 37 (25.70 %) respondents had prior academic experience of using Twitter. However, the rest of the participants at 107 (74.30%) had not.

Table 4.7: Prior experience of Twitter in relation to academic courses

Answer		Frequency	Percentage
Valid	Yes	37	25.70
	No	107	74.30
	Total	144	100.0

4.5.8 Distribution of participants' use of other social media applications for communication with their peers

Even though Twitter is the main application used in this study, participants were asked to report what other applications they used to communicate with their friends.

Figure 4.6 illustrates that 133 (78.50%) participants used WhatsApp for communication purposes. In addition, respondents used Snapchat at 39 (27.10%), Telegram at 8 (5.60%), and Facebook at 4 (2.80%).

Besides Twitter, WhatsApp is the most widely-used platform compared to Snapchat, Telegram, and Facebook for participants' communication with their peers.

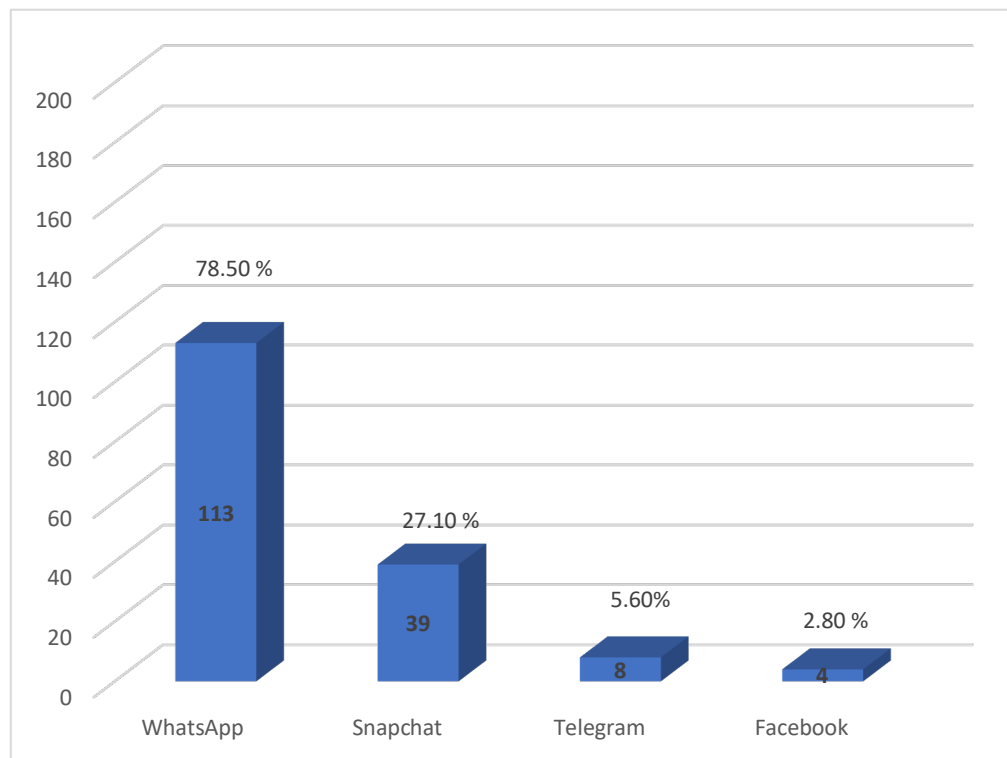


Figure 4.6: Other social media applications used for communication proposes

4.5.9 Distribution of the type of participants' Twitter accounts used for study purposes

Since the current project focus is on the use of Twitter in education, it is worth identifying the types of Twitter accounts that are used for study purposes. Therefore, respondents were asked to report whether they used their personal Twitter account or if they created a particular account for their study. As shown in Table 4.8, most students used their personal accounts at 84 (58.30 %), and 41 (28.50 %) participants generated a new account for study purposes; meanwhile, 19 (13.20 %) respondents used both accounts.

Table 4.8: Types of Twitter account used

Type of Twitter account		Frequency	Percentage
Valid	New account for study purpose	41	28.5
	My personal account	84	58.3
	Both	19	13.2
	Total	144	100.0

4.5.10 To what extent do students find Twitter's functions useful in their learning environment?

Respondents were asked to report whether they found Twitter's functions useful in the learning environment.

Figure 4.7 shows the result of participants' perceptions towards Twitter's functions. Those functions were given a rank in descending order according to their frequency (usefulness). Similarly, some of these items were used by Duncan & Barczyk (2013) to assess the usefulness of Facebook's functions.

Figure 4.7 indicates that the hashtag at 89 (61.80%) was the highest useful function in Twitter. The next useful function was photos at 86 (59.70%), then comments at 81 (56.30%), and the home page at 77 (53.50%). In contrast, the three least useful functions in Twitter identified by students are as follows: instant message at 36 (26.40%), likes/dislikes at 28 (19.40%), and music/audio at 22 (15.30%).

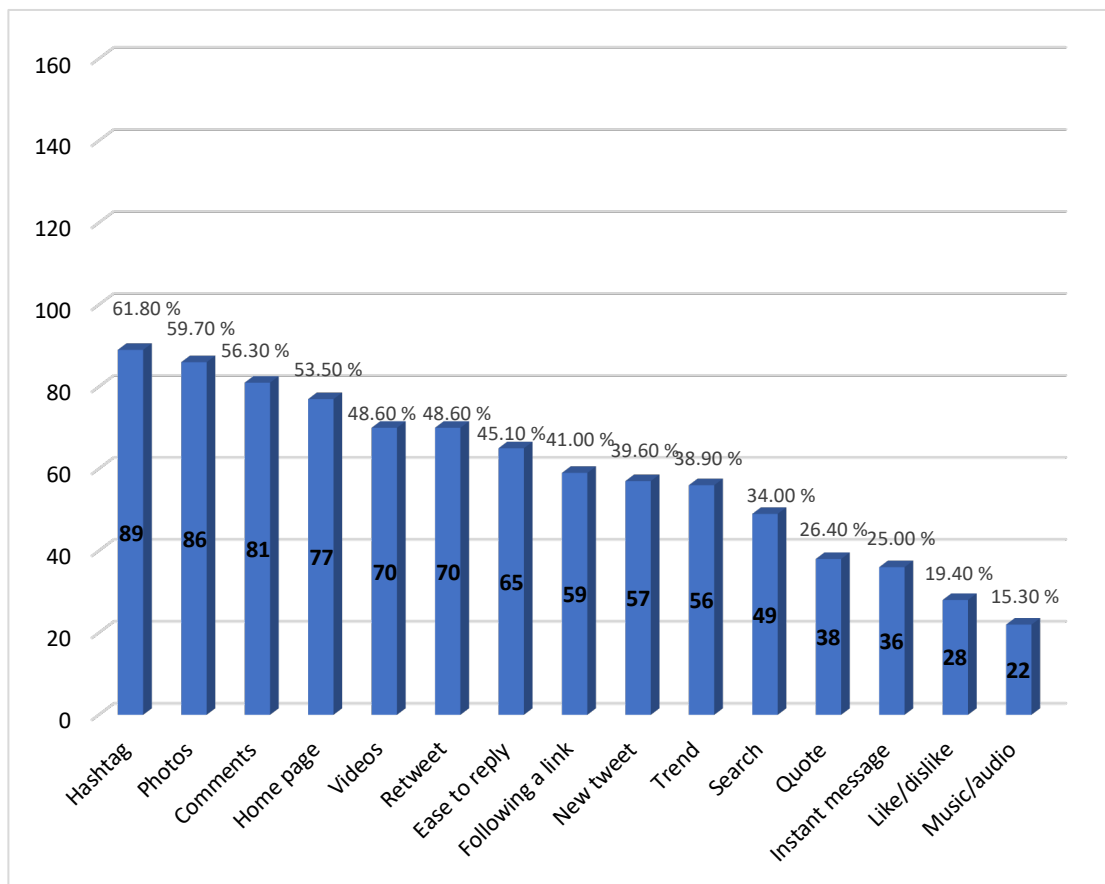


Figure 4.7: The usefulness of Twitter's functions

4.6 Exploratory factor analysis

4.6.1 Introduction

The current section undertakes the analysis of exploratory factors that identified the patterns of responses in the questionnaire. The data were analysed using the Statistical Package for Social Science (SPSS). The analysis identified six factors, and those factors are summarised and presented in table format. Thereafter, descriptive and inferential procedures were used to analyse the findings of these factors.

4.6.2 The basic rationale for using exploratory factor analysis (EFA)

Factor analysis is a multivariate statistical approach used widely in education and psychology (Williams, Onsman, & Brown, 2010). It is also defined as a collection of methods applied to identify the underlying constructs that influence the answers of participants in a number of measured variables (DeCoster, 1998). Thus, factor analysis is a technique of categorising variables that have something in common (Cohen *et al.*, 2013).

Factor analysis takes two different forms known as confirmatory factor analysis (CFA) and exploratory factor analysis (EFA) (Cohen *et al.*, 2013; DeCoster, 1998). CFA is a technique used when prior solid assumptions exist, from which investigators can validate hypotheses, prior models, or proposed theories (Taherdoost, Sahibuddin, & Jalaliyoon, 2014; Williams *et al.*, 2010). In contrast, EFA is a technique used when investigator has no prior expectation around the number of nature factors, to explore prior unidentified groups of variables, to find underlining patterns, grouping, and clustering (Cohen *et al.*, 2013; Taherdoost *et al.*, 2014; Williams *et al.*, 2010). Based on the previous differences, the suitable form of factor analysis for the current study is EFA.

Using EFA is an ideal way to measure things that are difficult to measure directly, i.e. ‘latent variables’ (Field, 2013). Importantly, EFA is widely utilised for identifying clusters of variables. This approach has three key purposes (Field, 2013), which will be explained and linked to the current study.

- To understand the structure of a set of variables, such as understanding the structure of latent variables;
- To construct a questionnaire to gauge underlying variables such as designing the current questionnaire to measure the use of Twitter in a learning environment; and
- To reduce the data to more manageable items, such as avoiding the different variables which evaluate the same underlying concept.

To conduct EFA, the researcher followed the five-step exploratory factor analysis protocol (Williams *et al.*, 2010) (see Figure 4.8).

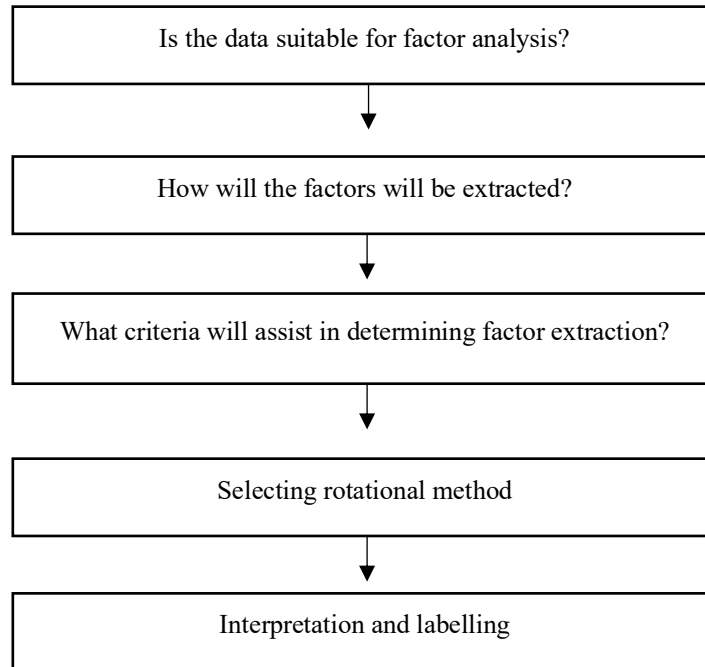


Figure 4.8: Five-step exploratory factor analysis protocol

4.6.3 Brief overview of assumption of EFA

To conduct EFA, certain assumptions need be met (Williams *et al.*, 2010). The first rule is related to the size of the research sample; according to the literature, there seems to be a lack of agreement on a suitable data size for EFA. To illustrate this, Tabachnick and Fidell (2007) indicate that 300 cases are the minimum for EFA, while Hair Jr, Anderson, Tatham, and William (1995) advocate that there should be 100 or more cases. In the current study, the number of cases is 144, which is greater than 100, thereby, the current data is suitable to run EFA. The second rule is related to the correlation matrix, which is utilised to determine the relationships between variables (Ullman, Tabachnick, & Fidell, 2001). This correlation has to be more than 0.30. For instance, the correlation matrix (loading) is categorised as the following ± 0.30 = minimal, ± 0.40 = important, and $\pm .50$ = practically significant (Williams *et al.*, 2010). In relation to the current study, all the items have a correlation matrix more the minimum standard 0.30, showing that the lowest loading among all items is 0.409. The third rule is connected to Kaiser-Meyer-Olkin's (KMO) measure of sampling adequacy/Bartlett's test of sphericity. Having data suitable for EFA, the KMO has to be 0.50 or greater and the test of sphericity needs to be a significant $p < 0.05$ (Williams *et al.*,

2010). In relation to the current study, the result of KMO is 0.858, which is greater than 0.5 and the p value is significant. Consequently, the data meets the assumptions of EFA (see Table 4.9).

Meeting prior assumptions leads us to consider the suitability of ordinal data. According to Manly and Alberto (2016), ordinal data including the Likert scale can be utilised to run factor analysis. Consequently, the data meets the assumptions of EFA.

Conducting EFA can be achieved through various analytic applications. Accordingly, in the current research, the SPSS was utilised to run the test. Provided that, the next section will describe and explain the process of conducting the test *via* SPSS.

Table 4.9: KMO and Bartlett's test of sphericity

Kaiser-Meyer-Olkin measure of sampling adequacy		.858
Bartlett's test of sphericity	Approx. Chi-Square	5477.666
	df	1431
	Sig.	.000

4.6.4 The process of running EFA in SPSS

This section undertakes the description of using SPSS to approach EFA and it highlights steps 2, 3, 4, and 5 in the EFA protocol (Figure 4.8) (Williams *et al.*, 2010). Initially, the researcher attempted to develop his skills in using SPSS in general and in conducting the EFA test. This development is approached *via* attending SPSS courses provided by the university, watching related videos on YouTube, exploring related literature such as discovering statistics using IBM SPSS statistics (Field, 2013), and discussing and receiving feedback during the supervision.

Regarding the extracted factor, the researcher ran EFA through SPSS using the principal component analysis (PCA) extraction method. This extraction is widely seen in published literature and is the default method in several statistical programs, such as SPSS (B. Thompson, 2004; Williams *et al.*, 2010). This can also be employed to reduce the number of variables (Tabachnick & Fidell, 2007). To assist with the determination of factor extraction, the output of EFA is based on eigenvalues greater than 1, which is the rule (Williams *et al.*, 2010) and the default value in most statistical programs such as SPSS. The scree result is presented below in which straight lines draw through the smaller eigenvalues. (see Figure 4.9)

A further explanation is related to the rotation applied; the rotation is basically selected for easy interpretation (Yong & Pearce, 2013). Rotation increases high item loadings and decreases low item loadings. The Orthogonal Varimax rotation is a technique widely used when factor structures seem uncorrelated (Williams *et al.*, 2010), so the Orthogonal Varimax rotation is applied in this project. Fundamentally, any coefficient less than 0.32 were suppressed to determine the strength of the relationship among the items and to identify the high loading. The 0.32 of suppression seems to be the cut-off point of factors in the literature (Yong & Pearce, 2013). It observed that the minimum factor loading was 0.42 in the current study.

The output of the EFA, produced by SPSS, is comprised of eleven factors. The researcher decided to maintain six factors as shown in Table 4.10, and remove the rest as shown in Table 4.11. The suppressed factors are 7, 8, 9, 10, and 11 because their item loading was greater in other factors or their items were less than three, considered as weak factors. These are also shown in the scree plot in Figure 4.9.

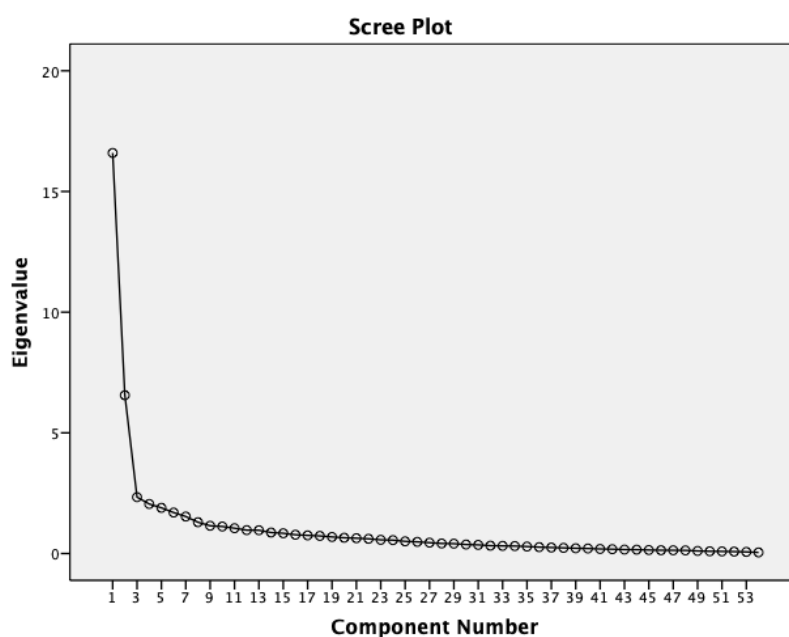


Figure 4.9: Scree plot

Table 4.10 shows six factors and their items loading besides the communalities of each items. In addition, the eigenvalues, variance (%) and reliability of each factor are presented.

Table 4.10: Exploratory factor analysis output

N	Original Item number	Observed variable (items)	Factor loading	Communalities	Derived variables (factors)	Eigenvalue	Variance (%)	Reliability Cronbach's alpha
	Factor 1							
1	11	Using Twitter for classroom discussions is very convenient.	.699	.764	Challenges	12.154	22.507	0.959
2	12	Twitter is more effective in the classroom than Blackboard.	.540	.616				
3	13	I feel more connected with classmates when using Twitter.	.612	.622				
4	14	I can contact my instructor more often using Twitter compared to when I did not have access to Twitter.	.588	.636				
5	15	How would you rate your agreement with the following statement: I acquired personal or professional growth after completing the course.	.628	.753				
6	16	Twitter promotes knowledge sharing.	.651	.654				
7	17	Twitter provides collaborative learning opportunities.	.676	.615				
8	18	The questions and answers on Twitter are very helpful.	.683	.600				
9	19	I enjoy using Twitter in the classroom for asking questions during lectures.	.730	.662				
10	21	Twitter is much more useful for the course than I thought it would be.	.801	.740				
11	22	Using Twitter makes learning easier.	.802	.755				
12	23	Using Twitter improves the quality of learning.	.749	.731				
13	24	I believe Twitter benefits my social learning network.	.790	.759				
14	34	I feel Twitter should be used more in courses.	.600	.744				
15	36	Twitter improves classroom interaction during lectures.	.649	.740				
16	37	Twitter improves interaction outside of class lectures.	.648	.616				
17	38	Twitter helps me to learn course materials more effectively.	.698	.773				
18	39	Using Twitter has made me feel more comfortable engaging in discussions during class time.	.723	.713				
19	40	Twitter has helped me to participate more in debates.	.726	.705				
20	43	Twitter has helped me to gain deeper understanding of the debate topic.	.709	.663				
21	44	Twitter has helped to understand the arguments of other participants in the debate.	.732	.726				
22	47	Twitter has helped me to prepare the role I had to play in the face-to-face debate.	.420	.674				
	Factor 2							
23	54	Twitter has badly affected my study.	.626	.656	Obstacles	5.208	9.644	0.881
24	55	Chatting with my friends distracts my study during lectures.	.616	.692				
25	58	I think lack of experience prevents me from using Twitter effectively.	.583	.679				
26	59	The information in Twitter is illogically organised and confusing.	.472	.682				

N	Original Item number	Observed variable (items)	Factor loading	Communalities	Derived variables (factors)	Eigenvalue	Variance (%)	Reliability Cronbach's alpha
27	60	There are accessibility issues within Twitter from time to time.	.724	.636				
28	61	Using Twitter for the study requires too much of my time.	.655	.664				
29	62	I have a lack of motivation and encouragement from my instructor.	.738	.692				
30	63	I am intimidated by the use of technology.	.808	.730				
31	64	I do not want to share my private social life with my school	.488	.666				
32	65	I do not have sufficient access to the internet.	.675	.546				
	Factor 3							
33	30	Twitter allows me to find and share educational resources.	.546	.770	Positive capacity of Twitter	3.242	6.004	0.852
34	31	Twitter allows me to communicate with classmates about course-related topics.	.725	.778				
35	32	I am encouraged to ask questions <i>via</i> Twitter.	.575	.632				
36	33	My educational goals are being met.	.678	.769				
	Factor 4							
37	48	How often do you ask questions or participate in class discussions?	.409	.598	Engagement	3.099	5.739	0.809 (If item 48 is deleted, the result of Cronbach's alpha will be 0.819)
38	49	I discuss grades or assignments with my instructor using Twitter.	.621	.581				
39	50	I discuss ideas from my readings or classes with faculty members outside of class.	.767	.755				
40	51	I discuss ideas from my reading or classes with others outside of class (students, family members, co-workers, etc.).	.743	.707				
41	52	I work with faculty members on activities other than coursework (committees, orientation, student life activities, etc.).	.748	.675				
	Factor 5							
42	20	Twitter was a distraction to learning in the course.	.589	.603	Disadvantages of Twitter	3.002	5.560	0.823 (If item 20 is deleted, the result of Cronbach's alpha will be 0.833)
43	41	Twitter has inhibited my participation in the debate.	.515	.663				
44	45	Twitter has caused more confusion than understanding.	.852	.845				
45	46	Twitter has not helped me to understand the topic or arguments in the debate.	.856	.848				
	Factor 6							
46	27	Twitter allows me to share my personal interests.	.663	.662	Pedagogical potential	2.557	4.736	0.773
47	28	Twitter allows me to personalise and express individuality and creativity.	.652	.722				
48	29	Twitter allows me to hold forums to discuss topics of interest.	.646	.705				

Table 4.11 shows five deleted items, more explanation will be in the next section which is results from the rotated component matrix

Table 4.11: Items deleted

Items deleted	
Item number	Observed variable (items)
35	Introducing Twitter in class affected my attendance.
42	Twitter has not influenced my participation in debates.
53	Using only 140 characters is not sufficient to express my ideas.
56	The level of privacy prohibits me from participating in Twitter.
57	There are information overloads when using Twitter.

Table 4.12: Comparing factor analysis assumptions within the current study

N	Suitability of data		Current data
1	Sample size	At least 300 responses (Howitt & Cramer, 2011; Tabachnick and Fidell, 2007; Yong & Pearce, 2013) 100 cases or greater (Hair Jr <i>et al.</i> , 1995) Cases are categories as 100 is poor, 200 is fair, 300 is good, 500 is very good and 1,000 or more is excellent (Williams <i>et al.</i> , 2010)	144 cases could be considered as a poor sample
2	Sample to variable (N: P) N: participants P: variables	The 'rules of thumb range anywhere from 3:1, 6:1, 10:1, 15:1, or 20:1' (Hair Jr, Black, Babin, Anderson, & Tatham, 2006; Hogarty, Hines, Kromrey, Ferron, & Mumford, 2005, cited in Williams <i>et al.</i> , 2010)	144:57 Between (2:1 and 3:1)
3	Correlation matrix	Over .30	Correlation matrix >.42
4	Kaiser-Meyer-Olkin (KMO)	KMO > .50	KMO= .858
5	Test of sphericity	Has to be significant (P<.05)	Sig. (.000)
6	Normality	Normality (Child, 2006)	Not normal distributed

4.6.5 Results from the rotated component matrix

This section embraces the fifth step in the EFA protocol interpretation. The results present factor loadings for all eleven components, wherein the loading for all items of more than 0.40, which is higher than the minimum suggested value. Most items were loaded onto a particular single construct, whilst a few items were loaded onto more than one construct. Those factors and items will be discussed in more detail in the following sections.

Twenty-two items were loaded in the first factor (see Table 4.13); these items seem to reflect and assess the challenges that students experience through their use of Twitter in their learning environment. This factor was named ‘challenges’. From this factor, items 11, 15, and 19 were also loaded into the third factor. Similarly, items 17 and 21 were additionally loaded into factors 11 and eight, respectively. However, those items were found to load more strongly into the first factor. Therefore, it was determined to include these items under the first construct. Overall, the loading for all items in factor one was from 0.420 to 0.802.

Ten items were loaded into the second factor, and these items seem to reflect and assess the obstacles that students may face when using Twitter in the learning environment. This factor was named ‘obstacles’ and items 30 and 33 were also loaded into the fifth and seventh factors, respectively. Nevertheless, these items were found to load more into the second factor. Therefore, it was determined to include both items under the second construct. Overall, the loading for all items in factor two was between 0.472 and 0.808.

Four items were loaded into the third factor, and these items seem to reflect and evaluate the success of Twitter in a learning environment; this factor was named ‘positive capacities of Twitter’. Overall, the loading for all items in factor three was above 0.546.

Five items were loaded into the fourth factor, and these items seemed to reflect and assess the engagement of students on Twitter; this factor was named ‘engagement’. For this factor, item 51 was also loaded negatively into the seventh component. However, this item was found to more related to items in factor four. This left only two items, so component seven was deleted and this item was included in the fourth construct. Overall, the loading for all items in factor four was between 0.409 and 0.767.

Four items were placed into the fifth factor, and these items seem to reflect and assess the downside of Twitter in relation to learning; this factor was named ‘disadvantages of Twitter’. In the same factor, item 45 was also loaded into the tenth component. However, this item was found to load more into the fifth factor. Thus, it was determined to include this item under the fifth construct. Moreover, the loading for all items in factor five was above 0.515.

Three items were loaded into the sixth factor, and these items seem to reflect and evaluate the role of the individual learner, so this factor was named; 'personalisation'. For this factor, item 47 was also loaded into the first component. However, this item was found to load more strongly in the sixth factor. Therefore, it was determined to include this item under the sixth construct. Overall, the loading for all items on factor six was above 0.646.

Factors seven, eight, nine, 10, and 11 were deleted for the following reasons:

Factor seven had only two items loaded into it after moving the third item (50), which was shifted to the fourth factor (see above). This factor can be considered weak because the number of items was less than three. Thus, it was deleted and items 48 and 49 were included elsewhere.

Factor eight had only one loaded item because the second item (21) was moved to the first factor (see above). This factor can also be considered weak because the number of items was less than three. Thus, item 51, about participation, was deleted.

Factor nine had only one loaded item, this factor can be considered as a weak factor since the number of items is less than three. Accordingly, item 52, about the character limit in Twitter posts, was deleted.

Factor 10 has only one loaded item as the second item (44) was moved to the fifth factor due to the explanation above. This factor can be considered weak, since the number of items is less than three. Thus, item 53, about the impact of Twitter on attendance, was deleted.

Factor 11 has no items left in it as item 17 was moved into the first factor due to the explanation above regarding factor one. Therefore, this factor was deleted.

Table 4.13: Rotated component matrix

N	Items	Component										
		1	2	3	4	5	6	7	8	9	10	11
1	Using Twitter makes learning easier.	.802										
2	Twitter is much more useful for the course than I thought it would be.	.801										
3	I believe Twitter benefits my social learning network.	.790										
4	Using Twitter improves the quality of learning.	.749										
5	Twitter has helped me to understand the arguments of other participants in the debate.	.732										
6	I enjoy using Twitter in the classroom for asking questions during lecture.	.730										
7	Twitter has helped me to participate more in debates.	.726										
8	Using Twitter has made me feel more comfortable engaging in discussions during class time.	.723										
9	Twitter has helped me to gain a deeper understanding of the topic in the debate.	.709										

10	Using Twitter for classroom discussions is very convenient.	.699											
11	Twitter has helped me to learn course materials more effectively.	.698	.436										
12	The questions and answers on Twitter were very helpful.	.683											
13	Twitter provides collaborative learning opportunities.	.676											
14	Twitter promotes knowledge sharing.	.651											
15	Twitter improves classroom interaction during lectures.	.649	.455										
16	Twitter improves interaction outside of class lectures.	.648											
17	How would you rate your agreement with the following statement: I acquired personal or professional growth after completing the course.	.628											.513
18	I feel more connected with classmates by using Twitter.	.612											
19	I feel Twitter should be used more in courses.	.600	.437										
20	I can contact my instructor more often using Twitter compared to when I did not have access to it.	.588											
21	Twitter is more effective in the classroom than Blackboard.	.540							.430				
22	Twitter has helped me to prepare for the role I have to play in face-to-face debates.	.420											
23	I am intimidated by the use of technology.	.808											
24	I have a lack of motivation and encouragement from my instructor.	.738											
25	There are accessibility issues within Twitter from time to time.	.724											
26	I do not have sufficient access to the internet.	.675											
27	Using Twitter for the study requires too much of my time.	.655											
28	Twitter has negatively affected my studies.	.626											
29	Chatting with my friends on Twitter distracts me from my study during lectures.	.616			.451								
30	I think my lack of experience prevents me from using Twitter effectively.	.583											
31	I do not want to share my private social life with my school.	.488											
32	The information in Twitter is illogically organised and confusing.	.472						.432					
33	Twitter allows me to communicate with classmates about course-related topics.	.725											
34	My educational goals are being met.	.678											
35	I am encouraged to ask questions via Twitter.	.575											
36	Twitter allows me to find and share educational resources.	.546			.478								
37	I can discuss ideas from my reading or class with faculty members outside of the class.	.767											
38	I can work with faculty members on activities other than coursework (committees, orientation, student life activities, etc.).	.748											
39	I can discuss ideas from my reading or classes with others outside of the class (students, family members, co-workers, etc.).	.743											
40	I can discuss my grades or assignments with my instructor using Twitter.	.621											
41	Twitter has not helped me to understand the topic or argument in debates.	.856											
42	Twitter has caused more confusion than understanding.	.852											
43	Twitter was a distraction to learning in the course.	.589											
44	Twitter has inhibited my participation in the debate.	.515										.443	

45	Twitter allows me to share my personal interests.						.663					
46	Twitter allows me to personalise and express my individuality and creativity.	.431					.652					
47	Twitter allows me to hold forums to discuss topics of interest.						.646					
48	There are information overloads when using Twitter.							.770				
49	The level of privacy prohibits me from participating in Twitter.							.536				
50	How often do you ask questions or participate in class discussions?				.409			-.463				
51	Twitter has not influenced my participation in debates.								.685			
52	140 characters is not sufficient to express my ideas.									.805		
53	Introducing Twitter in class affects my attendance.										.779	

To conclude, EFA reduced the number of questionnaire items and produced a new factor (dimension) structure. These factors will be used to organise the whole thesis structure. Therefore, the descriptive and inferential analysis will be presented in depth, according to the research factors.

Factor 1: Challenges

To what extent do students find challenges of integrating Twitter in a learning environment beneficial/detrimental and how?

Factor 2: Obstacles

What are the perceived obstacles to integrating social media (Twitter) in educational disciplines?

Factor 3: Positive capacity of Twitter

What are the perceived disadvantages of integrating Twitter into educational disciplines?

Factor 4: Engagement

To what extent do students believe that using Twitter has a positive capacity in their learning environment?

Factor 5: Disadvantages of Twitter

To what extent do students engage *via* social media (Twitter) for educationally relevant purposes?

Factor 6: Personalisation

To what extent do students believe social media (Twitter) offers pedagogical potential in their learning environment?

4.7 Descriptive analysis

The current section focuses on presenting the descriptive results of the questionnaires. This explores six factors/research questions using a five-point Likert scale; these results will be shown in tables along with their mean, rank, and attitude. Thereafter, the findings will be explored below each table.

4.7.1 First factor: The challenges

This section presents the results of the first factor, aiming to address the research question ‘*To what extent do students find challenges of integrating Twitter in a learning environment beneficial/detrimental and how?*’ In factor 22, items assess the challenges that students experience during the integration of Twitter into their learning environment. The items are demonstrated in Table 4.14 and to simplify and explore these in more detail, these items are categorising into several representative groups, which reflect the whole factor of challenges. Items are also given a rank in descending order, according to their mean (M) along with their attitude.

Table 4.14: Challenges items in descending order according to their mean

N	Items		Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Mean	Std. dev.	Rank	Attitude
Preparing with activities before the class											
1	Twitter has helped me to prepare the role I had to play in face-to-face debates.	F	41	57	30	14	2	3.84	0.99	19	Agree
		%	28.5	39.6	20.8	9.7	1.4				
Activities in the classroom											
2	Using Twitter for classroom discussions is very convenient.	F	60	57	15	9	3	4.13	0.98	1	Agree
		%	41.7	39.6	10.4	6.3	2.1				
3	Using Twitter has made me feel more comfortable engaging in discussions during class time.	F	50	56	26	6	6	3.96	1.04	14	Agree
		%	34.7	38.9	18.1	4.2	4.2				
4	Twitter is more effective in the classroom than Blackboard.	F	55	54	18	12	5	3.99	1.08	10	Agree
		%	38.2	37.5	12.5	8.3	3.5				
5	Using Twitter improves the quality of courses.	F	53	62	19	7	3	4.08	0.94	5	Agree
		%	36.8	43.1	13.2	4.9	2.1				
6	I feel Twitter should be used more in courses.	F	50	60	22	6	6	3.99	1.02	10	Agree
		%	34.7	41.7	15.3	4.2	4.2				
Activities beyond class sessions											
7	Twitter improves interaction outside of class lectures.	F	46	58	24	11	5	3.90	1.05	17	Agree
		%	31.9	40.3	16.7	7.6	3.5				
Dissemination											
8	I believe Twitter benefits my social learning network.	F	55	57	20	7	5	4.04	1.02	8	Agree
		%	38.20	39.60	13.90	4.90	3.50				
9	Twitter promotes knowledge sharing.	F	51	69	15	6	3	4.10	.898	3	Agree
		%	35.4	47.9	10.4	4.2	2.1				
Communication											

N	Items		Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Mean	Std. dev.	Rank	Attitude
10	I feel more connected with my classmates using Twitter.	F	46	56	25	13	4	3.88	1.05	18	Agree
		%	31.9	38.9	17.4	9	2.8				
11	I can contact my instructor more often using Twitter compared to when I did not have access to Twitter.	F	41	47	27	19	10	3.63	1.22	22	Agree
		%	28.5	32.6	18.8	13.2	6.9				
Interaction and collaboration											
12	Twitter improves classroom interaction during lectures.	F	53	52	28	7	4	3.99	1.01	10	Agree
		%	36.8	36.1	19.4	4.9	2.8				
13	Twitter improves interaction outside of class lectures.	F	46	58	24	11	5	3.90	1.05	17	Agree
		%	31.9	40.3	16.7	7.6	3.5				
14	Twitter has helped me to participate more in debates.	F	48	57	27	7	5	3.94	1.01	15	Agree
		%	33.3	39.6	18.8	4.9	3.5				
15	Twitter provides collaborative learning opportunities.	F	55	58	23	6	2	4.10	0.91	3	Agree
		%	38.20	40.30	16.00	4.20	1.40				
Questions and answers											
16	The questions and answers on Twitter are very helpful.	F	53	62	24	3	2	4.12	0.86	2	Agree
		%	36.8	43.1	16.7	2.1	1.4				
17	I enjoy using Twitter in the classroom for asking questions during lectures.	F	55	58	22	5	4	4.08	0.96	5	Agree
		%	38.2	40.3	15.3	3.5	2.8				
Understanding											
18	Twitter helps me to achieve a deeper understanding of the topic under debate.	F	44	68	21	8	3	3.99	0.93	10	Agree
		%	30.6	47.2	14.6	5.6	2.1				
19	Twitter has helped me understand the argument of other participants of the debate.	F	41	66	27	7	3	3.94	0.93	15	Agree
		%	28.5	45.8	18.8	4.9	2.1				
Twitter is more useful than I thought											
20	Twitter is much more useful for the course than I thought it would be.	F	48	62	24	6	4	4.00	0.961	9	Agree
		%	33.3	43.1	16.7	4.2	2.8				
Learning											
21	I acquired personal or professional growth after completing the course.	F	30	57	36	14	7	3.62	1.07	23	Agree
		%	20.8	39.6	25	9.7	4.9				
22	Twitter helped me to learn course materials more effectively.	F	48	44	37	9	6	3.83	1.09	20	Agree
		%	33.3	30.6	25.7	6.3	4.2				
23	Using Twitter makes learning easier.	F	57	56	19	7	5	4.06	1.02	7	Agree
		%	39.6	38.9	13.2	4.9	3.5				
N		F	144	Total mean = 3.95 = Agree							
		%	100								

The results of this table will be explored in depth in relation to table organisation, particularly items that will be analysed according to their categories.

4.7.1.1 Preparing for educational activities before class

The results in the first category show that participants found Twitter to be a positive tool in helping them prepare their activities before attending class. A single item was utilised for the assessment; the mean score of this item was 3.84 (agree). To illustrate this, the proportion of the agreement (strongly agree and agree) was 68.10% and the number of participants in agreement was 98. This indicates that Twitter helped more than half of the students to be ready for activities before attending the actual class. The total disagreement (strongly disagree and disagree) was 11.10%, with 16 participants. Thus, Twitter is perceived as a useful tool that can be used to prepare before attending class. To conclude, students find the challenge of integrating Twitter for activities before class beneficial.

4.7.1.2 Educational activities in the classroom

The result in the second category indicated positive outcomes related to the usage of Twitter in the classroom; this category consisted of five items. The mean of students' responses in the item (N=2) was 4.1 (agree). To elaborate, the proportion of the agreement (strongly agree and agree) was 81.3% and the number of participants in the agreement columns was 117. Meanwhile, the proportion of disagreement was 8.40% for 12 participants. It should be noted that this item had the highest mean among all items in this section. This implies that participants believe that they are engaging in discussions *via* a convenient tool, suggesting that Twitter as a practical tool for classroom activities such as classroom discussion. For the next item (N=3), the mean of students' responses was 4.0 (agree). The overall percentage of agreement (strongly agree and agree) for this item was 73.6% (106 participants), whereas the percentage of disagreement was 8.4% (12 participants). Having positive results for this item indicates that discussions *via* Twitter during class is perceived as convenient and students are comfortable using the platform in this way. For the following item (N=4) students' responses had a mean of 4.0 (agree). The overall percentage agreement (strongly agree and agree) for this item was 75.7% (109 participants). Meanwhile, the proportion of disagreement of 17 participants was 11.80%. Twitter was considered by most students as a more effective tool than Blackboard. For the following item in this group (N=5), the mean of students' responses was 4.1 (agree). The total agreement (strongly agree and agree) for this item was 76.4% (115 participants). Meanwhile for 10 participants, the proportion of disagreement was 7.00%. A high agreement for the previous item led to positive results in the

next item (N=6). The mean of students' responses was 3.99 (agree). The total number of agreements (strongly agree and agree) for this item was 75.70% (111 participants). Meanwhile, for 12 participants, the proportion of disagreement was 8.40%. Overall, in this study, students had positive perceptions towards Twitter and felt it was an appropriate tool for classroom activities when utilised correctly. Consequently, students find the challenge of integrating Twitter into classroom activities beneficial.

4.7.1.3 Educational activities outside the classroom

The results in the third category suggest an optimistic finding relating to the use of Twitter outside the classroom; this category consisted of one item. The mean of students' responses to the item (N=7) was 3.90 (agree). The proportion of the total agreement (strongly agree and agree) was 72.2% (104 participants), whereas the total percentage of disagreement (strongly disagree and disagree) was 11.10% (16 participants). This showed that Twitter is a powerful tool for extending educational activities outside the classroom and may indicate the importance of Twitter in expanding and improving classroom discussion and interactions outside the classroom. Consequently, students find the challenge of integrating Twitter for educational activities outside the classroom beneficial.

4.7.1.4 Dissemination

The result in the fourth category suggested that Twitter is a great tool for dissemination; two items were used for the assessment. The mean of students' responses for item (N=8) was 4.04 (agree). The percentage of total agreement (strongly agree and agree) was 77.80% (112 participants), whereas, the total disagreement (strongly disagree and disagree) was only 8.40% (12 participants). The next item was 'Twitter promotes knowledge sharing' (N=9). Knowledge includes course-related topics and ideas, extra reading materials, and news related to the classroom. The mean of students' responses was 4.10 (agree). The total agreement (strongly agree and agree) proportion was 84.30% (120 participants) whereas, the percentage of disagreement (strongly disagree and disagree) was only 6.30% (9 participants). Based on these results, Twitter enhances knowledge sharing among students. Therefore, students find the challenge of integrating Twitter for dissemination helpful.

4.7.1.5 Communication

The results in the fifth category indicated that Twitter is an ideal tool for communication; two items were used for this evaluation. The mean of students' responses in the item (N=10) were 3.88 (agree). The total agreement (strongly agree and agree) proposition was 70.80% (102 participants), whereas, the percentage of disagreement (strongly disagree and disagree) was only 14.60% (21 participants). The following item (N=11), had a mean of 3.63 (agree). The total agreement (strongly agree and agree) proportion was 61.10% (88 participants), whereas the percentage of disagreement (strongly disagree and disagree) was only 20.10% (29 participants). The positive students' perceptions revealed that Twitter is a tool that students use for connecting with other learners or instructors and it supports the establishment of a communication environment. Thus, students find the challenge of integrating Twitter for communication valuable.

4.7.1.6 Interaction and collaboration

The results in the sixth category show that Twitter improves students' interaction and collaboration; this category contained four items. The mean of students' responses in item (N=12) was 3.99 (agree). The total agreement (strongly agree and agree) for this item was 72.90% (105 participants), whereas, the total disagreement (strongly disagree and disagree) was only 7.70% (11 participants). The next item was (N=13) and the mean of the responses was 3.90 (agree). The total agreement (strongly agree and agree) for this item was 72.20% (104 participants), whereas, the total disagreement (strongly disagree and disagree) was 11.10% (16 participants). The following item was (N=14). The mean of the responses to this item was 3.94 (agree). The total agreement (strongly agree and agree) for this item was 72.90% (105 participants), whereas, the total disagreement (strongly disagree and disagree) was only 8.40% (12 participants). Thus, students found social media to be an environment for interaction both in and out the classroom, in addition to boosting their participation. In addition to investigating interaction, collaboration on Twitter was also examined; for item (N=15), which related to collaboration, the mean of the responses was 4.10 (agree). The total agreement (strongly agree and agree) proportion for this item was 78.50% (113 participants), whereas, the total disagreement (strongly disagree and disagree) was only 5.60% (8 participants). The positive students' perceptions revealed that social media platforms are tools that students use for interacting with other learners or instructors and support the establishment of a collaborative environment. To conclude, students find the challenge of integrating Twitter for interaction and collaboration helpful.

4.7.1.7 Questions and answers

The results in the seventh category show that Twitter encourages students to ask questions and obtain answers; this category contains two items. The mean of students' responses for item (N=16) was 4.12 (agree). The total agreement (strongly agree and agree) portion for this item was 79.90% (115 participants), whereas, total disagreement (strongly disagree and disagree) was merely 3.50% (five participants). The next item's (N=17) mean responses was 4.08 (agree). The total agreement (strongly agree and agree) portion for this item was 78.50% (113 participants), whereas, the total disagreement (strongly disagree and disagree) was merely 6.30% (nine participants). The results of both items show that most students find these activities helpful and their experience is fulfilling. Learners' perceptions of questioning and obtaining answers *via* Twitter is helpful and enjoyable. Consequently, students find the challenge of integrating Twitter for asking questions and obtaining answers beneficial.

4.7.1.8 Understanding

The results in the eighth category indicate that Twitter helps learners to achieve further understanding; this category contained two items. The mean of students' responses for the item (N=18) was 3.99 (agree). The total agreement (strongly agree and agree) for this item was 77.80% (112 participants), whereas, the total disagreement (strongly disagree and disagree) was merely 7.00% (11 participants). The next related item was (N=19) and mean of the responses was 3.99 (agree). The total agreement (strongly agree and agree) for this item was 68.10% (98 participants), whereas, the total disagreement (strongly disagree and disagree) was merely 11.10% (16 participants). This result suggests that Twitter is seen as an effective tool for increasing students' understanding of the educational topic.

4.7.1.9 Twitter is more useful more than I thought

The result in the ninth category indicates the change in students' thoughts about Twitter being a useful tool in relation to their studies; this category consists of one item. The mean of students' responses for item (N=20) was 4.00 (agree). The total agreement (strongly agree and agree) for this item was 76.40% (110 participants) whereas, the total disagreement (strongly disagree and disagree) was merely 7.00% (11 participants). This result showed the change in students' thoughts before and after using Twitter for learning. Consequently, students find the integration of Twitter into the learning setting beneficial as it exceeds their original expectations.

4.7.1.10 Learning

The results in the tenth category present participants' positive experiences; this category contains three items. The mean of students' responses for item (N=21) was 3.62 (Agree). The portion of agreement (strongly agree and agree) was 60.40% (87 participants), whereas, the portion of disagreement (strongly disagree and disagree) was only 14.60% (21 participants). The next item was (N=22) and the mean of students' responses was 3.83 (agree). The portion of agreement (strongly agree and agree) was 63.90% (92 participants) whereas, the portion of disagreement (strongly disagree and disagree) was only 10.50% (15 participants). The following item attempted to determine students' ease of learning *via* Twitter (N=23) and the mean of students' responses was 4.06 (agree). Agreement (strongly agree and agree) was 78.90% (113 participants), whereas, disagreement (strongly disagree and disagree) was only 8.40% (12 participants). These outcomes show the positive experience in relation to students' learning, which indicates that students find the challenge of integrating Twitter into learning setting effective and beneficial.

To conclude, the mean score for all items lies between 4.13 and 3.62, which is the agreement position of all participants. The average mean for all items is 3.88 (agree), which also shows that respondents tend to agree with items used to assess the challenges. Thus, the challenges that arose from incorporating Twitter into student's learning environments were positive experiences based on students' perceptions *via* the questionnaires.

A minority groups of participants disagreed (disagree or strongly disagree). Therefore, even though these challenges were positively experienced by the vast majority of participants, a few students had negative experiences of these challenges.

The researcher aims to run an internal analysis (inferential) to further explore the findings in terms of categorical data, such as prior online experience, prior Twitter academic experience, and frequency (rarely and more than five times a day). Hence, three hypotheses were constructed to explore this further:

Is there a statistically significant difference in the responses to the challenges of using Twitter in terms of the variable 'prior online experience'?

H0: There are no differences in responses to the challenges between students who had prior online experiences and students who did not.

Is there a statistically significant difference in responses to the challenges in terms of the variable 'prior Twitter academic experience'?

H0: There are no differences in challenges between students who had prior Twitter academic experience and students who did not.

Is there a statistically significant difference in the challenges relating to the variable ‘frequency’ (rarely and more than five times a day)?

H0: There is no difference in the challenges between students who use Twitter rarely (less than once a day) and students who use Twitter more than five times a day.

4.7.2 Second factor: Obstacles

This section presents the results of the second factor, aiming to address the research question ‘What are the perceived obstacles to integrating social media (Twitter) in educational disciplines?’ For this factor, 10 items assess the obstacles that students face during the integration of Twitter into their learning environment. Table 4.15 presents the findings in relation to participants’ attitudes towards identifying those obstacles. The items were ranked in ascending order according to their mean (M). Table 4.15 presents the results of participants’ responses and perceptions towards Twitter’s obstacles, including their means and standard deviations.

Table 4.15: Obstacles items in descending order according to their mean

N	Tools		Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Mean	Std. dev.	Rank	Attitude
1	I do not want to share my private social life with my school.	F	32	22	30	31	29	2.98	1.44	10	Neither agree nor disagree
		%	22.2	15.3	20.8	21.5	20.1				
2	Twitter has badly affected my study.	F	6	14	23	55	46	2.16	1.10	2	Disagree
		%	4.2	9.7	16	38.2	31.9				
3	Chatting with my friends distracts me from my studies during lectures.	F	7	18	31	50	38	2.35	1.14	4	Disagree
		%	4.9	12.5	21.5	34.7	26.4				
4	I think lack of experience prevents me from using Twitter effectively.	F	10	32	18	42	42	2.49	1.31	6	Disagree
		%	6.9	22.2	12.5	29.2	29.2				
5	The information in Twitter is illogically organised and confusing.	F	12	26	42	36	28	2.71	1.21	9	Neither agree nor disagree
		%	8.3	18.1	29.2	25	19.4				
6	There are accessibility issues within Twitter from time to time.	F	8	34	22	43	37	2.53	1.26	7	Disagree
		%	5.6	23.6	15.3	29.9	25.7				
7	I do not have sufficient access to the internet.	F	10	18	27	38	51	2.29	1.26	3	Disagree
		%	6.9	12.5	18.8	26.4	35.4				
8	Using Twitter for the study requires too much of my time.	F	15	21	31	37	40	2.54	1.32	8	Disagree
		%	10.4	14.6	21.5	25.7	27.8				
9	I have a lack of motivation and encouragement from my instructor.	F	8	20	39	30	47	2.39	1.23	5	Disagree
		%	5.6	13.9	27.1	20.8	32.6				
10	I am intimidated by the use of technology.	F	8	14	24	36	62	2.10	1.22	1	Disagree
		%	5.6	9.7	16.7	25	43.1				
N		F	144	Total mean = 2.45 = Disagree							
		%	100								

The results of this table will be explored in depth by presenting the outcome of each item individually. The mean of students’ responses for the first item (N=1) was 2.98 (neither agree nor disagree). The portion of disagreement (strongly disagree and disagree) was 41.60% with 60 participants, whereas, the agreement (strongly agree and agree) was 37.50% for 54 participants. Consequently, the result of this item is based on the number of participants for both agreement and disagreement rather than relying on the mean of the total participants. Therefore, the number

of disagreement responses is slightly more than those of agreement. Consequently, sharing one's private life alongside academic life *via* Twitter may not be considered as the main obstacle that prevents most students from implementing social media in their learning and teaching environment. Further outcomes will be discussed in the interview chapter. However, this result is based on the disagreement responses of the majority. The number of agreements also appears to be. This needs further explanation or further data during the interview phase.

For the second item (N=2), the mean of students' responses was 2.16 (disagree). The portion of disagreement (strongly disagree and disagree) was 61.10% (88 participants), whereas the agreement (strongly agree and agree) was 17.40% (25 participants). In this study, the majority of respondents denied the adverse effect of Twitter on their studies. This finding may help in increasing the credibility Twitter being used within the learning environment as this contributes to the overall study.

For the third item (N=3), the mean of students' responses was 2.35 (disagree). The portion of disagreement (strongly disagree and disagree) was 70.10% (101 participants), whereas the portion of agreement (strongly agree and agree) was merely 13.90% (20 participants). The result showed that that non-educational discussion with friends is less distracting during lecture time, according to most participants.

For the fourth item (N=4), the mean of students' responses was 2.49 (disagree). The disagreement (strongly disagree and disagree) was 58.40% (84 participants), whereas the portion of agreement (strongly agree and agree) was 29.10% (42 participants). Based on this, having no previous experience does not appear to minimise the effectiveness of Twitter.

For the fifth item (N=5), the mean of students' responses in this item was 2.71 (Neither agree nor disagree). The portion of disagreement (strongly disagree and disagree) was 44.40% (64 participants), whereas the agreement (strongly agree and agree) for this item was merely 26.40% (38 participants). Even though the disagreement responses are almost double the agreement responses, the mean is placed on 'neither agree nor disagree'. Therefore, the result of this item is based on the number of participants who agreed or disagreed, rather than relying on the mean of the total participants. The highest number of responses for this item indicated disagreement. Based on this, the finding showed that learners found that information in Twitter was logically organised and not confusing.

For the sixth item (N=6), the mean of students' responses was 2.53 (disagree). The portion of disagreement (strongly disagree and disagree) was 55.60% (80 participants), whereas the portion of agreement (strongly agree and agree) was 29.20% (42 participants). Most students reported that they did not have difficulties accessing Twitter.

For the seventh item (N=7), the mean of students' responses was 2.29 (disagree). The portion of disagreement (strongly disagree and disagree) was 61.80% (89 participants) whereas, the portion of agreement (strongly agree and agree) was 19.40% (28 participants). Based on the majority of responses, the result demonstrates that there were no issues in accessing the internet

For the eighth item (N=8), the mean of students' responses was 2.54 (disagree). The portion of disagreement (strongly disagree and disagree) was 53.50% for 77 participants, whereas the portion of agreement (strongly agree and agree) was 25.00% (36 participants). The result of the current study indicated that Twitter did not require too much of the students' time as reported by the majority of respondents. It should be noted that the item was employed only to investigate whether using Twitter for educational purposes requires exclusive time or not.

For the ninth item (N=9), the mean of students' responses was 2.39 (disagree). The portion of disagreement (strongly disagree and disagree) was 53.40% of 77 participants, whereas, the proportion of agreement (strongly agree and agree) was 19.50% of 28 participants. This outcome showed that the majority of participants received motivation and encouragement from their instructors. This is important for successful Twitter integration.

For the tenth item (N=3), the mean of students' responses was 2.10 (disagree). The proportion of disagreement (strongly disagree and disagree) was 68.10% (98 participants), whereas, the percentages of agreement (strongly agree and agree) was 15.30% (22 participants). The result indicated that most of participants are not intimidated by the use of social media.

Overall, the mean score for all items lies between 2.98 and 2.10, while the average mean for all items is 2.45 (disagree), which shows that respondents disagree with all of the posed questions. Therefore, it is interesting that students' perceptions towards obstacles did not reveal any key challenges that might prevent Twitter from being incorporated into a learning environment.

A minority of participants gave agreement responses (agree or strongly agree). Therefore, even though these results did not show any key obstacles by the vast majority of participants, a few students found that obstacles did prevent them from learning when Twitter was incorporated into the learning environment. The researcher aims to run internal analysis (inferential) to further explore the findings in terms of prior online experience and prior Twitter academic experience. Hence, two hypotheses were constructed to explore this further:

Is there a statistically significant difference in the perceived obstacles in terms of the variable 'prior online experience'?

H0: There are no differences in the perceived obstacles between students who had prior online experiences and students who did not.

Is there a statistically significant difference in the obstacles in terms of the variable 'prior Twitter academic experience'?

There are no differences in the obstacles between students who had prior Twitter academic experience and students who did not.

4.7.3 Third factor: Disadvantages of Twitter

This section presents the results of the third factor, aiming to address the research question ‘What are the perceived disadvantages of integrating Twitter into educational disciplines?’ For this factor, four items assessed the disadvantages of Twitter experienced by students during the integration of Twitter into their learning environment. Table 4.16 presents the findings of participants’ attitudes towards the disadvantages of Twitter. These items were given a rank in ascending order according to their mean (M). This ascending order means that the smallest mean is considered the least disadvantage compared to other disadvantages in the table.

Table 4.16: Disadvantages of Twitter items in descending order according to their mean

N	Tools		Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Mean	Std. dev.	Rank	Attitude
1	Twitter was a distraction to learning in the course.	F	15	12	27	42	48	2.33	1.30	1	Disagree
		%	10.4	8.3	18.8	29.2	33.3				
2	Twitter inhibited my participation in the debate.	F	16	26	22	39	41	2.56	1.36	4	Disagree
		%	11.1	18.1	15.3	27.1	28.5				
3	Twitter has not helped me to understand the topic and argument in the debate.	F	15	24	16	49	40	2.48	1.33	3	Disagree
		%	10.4	16.7	11.1	34	27.8				
4	Twitter has caused more confusion than understanding.	F	13	23	21	45	42	2.44	1.31	2	Disagree
		%	9.00	16.00	14.60	31.30	29.20				
N		F	144	Total mean = 2.45 = Disagree							
		%	100								

The results of this table will be explored in depth by presenting the outcome of each item individually. The mean of students’ responses in the first item (N=1) was 2.33 (disagree). The percentage of disagreement (strongly disagree and disagree) was 62.50% (90 participants), whereas the portion of agreement (strongly agree and agree) was 18.07% (27 participants). The current study revealed that most participants did not find Twitter to be a distracting tool during their learning on the course. Consequently, study and learning are not adversely influenced by the integration of Twitter.

For the following item (N=2), the mean of students’ responses was 2.56 (disagree). The portion of disagreement (strongly disagree and disagree) was 55.60% (80 participants), whereas the portion of agreement (strongly agree and agree) was 29.20% (42 participants). This indicates that Twitter does not inhibit learners when participating in debates.

For the third item (N=3), the mean of students’ responses was 2.48 (disagree). The portion of disagreement (strongly disagree and disagree) was 61.80% (89 participants), whereas the portion

of agreement (strongly agree and agree) was 27.10% (39 participants). This indicates that Twitter helps learners to participate and understand topic-related debates.

For the final item (N=4), the mean of students' responses was 2.44 (disagree). The portion of disagreement (strongly disagree and disagree) was 60.50% (87 participants), whereas, the portion of agreement (strongly agree and agree) was 25.00% (36 participants). This result suggests that Twitter does not cause confusion.

Overall, the mean score for all items lies between 2.56 (disagree) and 2.33 (disagree) and the overall mean for all items is 2.45 (disagree), which shows that respondents disagreed about the posed disadvantages, indicating participants tended to disagree with negative statements. Because students' perceptions did not reveal any key disadvantages, Twitter is seen as a beneficial tool in a learning environment.

On the other hand, there were a minority of participants who placed their responses in agreement (agree or strongly agree). Therefore, even though the vast majority of participant did not identify any key disadvantages, a few students found that Twitter hindered their learning. Based on this, the researcher aims to run an internal analysis (inferential) to further explore the current findings in terms of prior online experience and prior Twitter academic experience. Hence, two hypotheses were constructed to explore this further, these are listed below.

Is there a statistically significant difference in the responses to the disadvantages of Twitter in terms of the variable: prior online experience?

H0: There are no differences in the responses to the disadvantages of Twitter between students who had prior online experiences and students who had not.

Is there a statistically significant difference in the responses to the disadvantages of Twitter in terms of the variable: prior Twitter academic experience?

H0: There are no differences in the responses to the disadvantages of Twitter between students who had prior Twitter academic experience and students who had not.

4.7.4 Fourth factor: Positive capacity

This section presents the results of the fourth factor, aiming to address the research question ‘To what extent do students perceive that using Twitter has a positive capacity into their learning environment?’ For this factor, four items assessed the disadvantages of Twitter that students experienced during the integration of the platform into their learning environment. Table 4.17 shows participants’ attitude towards the positive capacity of Twitter in their learning environment. Items were given a rank in descending order according to their mean (M).

Table 4.17: Positive capacity items in descending order according to their mean

N	Tools		Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Mean	Std. dev.	Rank	Attitude
1	Twitter allows me to find and share educational resources.	F	45	62	22	10	5	3.92	1.03	2	Agree
		%	31.3	43.1	15.3	6.9	3.5				
2	Twitter allows me to communicate with classmates about course-related topics.	F	45	55	30	7	7	3.86	1.07	3	Agree
		%	31.30	38.20	20.80	4.90	4.90				
3	I am encouraged to ask questions <i>via</i> Twitter.	F	55	52	26	8	3	4.03	0.989	1	Agree
		%	38.2	36.1	18.1	5.6	2.1				
4	My educational goals are being met.	F	41	43	48	9	3	3.76	1.00	4	Agree
		%	28.5	29.9	33.3	6.3	2.1				
N		F	144	Total mean = 3.89 = Agree							
		%	100								

The results of this table will be explored in depth by presenting the outcome of each item individually. The mean of students’ responses in the first item (N=1) was 3.92 (agree). The portion of agreement (strongly agree and agree) was 74.40% (107 participants), whereas, the portion of disagreement (strongly disagree and disagree) was 10.40% (15 participants). This finding exposed that Twitter allows users to find and share educational resources.

The mean of the following item (N=2) was 3.86 (agree). The portion of agreement (strongly agree and agree) was 69.50% (100 participants), whereas the percentages of disagreement (strongly disagree and disagree) was 9.80% (14 participants). The result indicates that learners find Twitter to be a platform for communicating with each other regarding course-related topics. This is expounded in more detail during the interviews.

The mean of the third item (N=3) was 4.03 (agree). The portion of agreement (strongly agree and agree) was 74.30% (107 participants), whereas the portion of disagreement (strongly disagree and disagree) was 7.70% (11 participants). This suggests that learners felt motivated to tweet questions *via* Twitter.

The mean of the final item (N=4) was 3.76 (agree). The portion of agreement (strongly agree and agree) was 58.40% (84 participants), whereas the percentages of disagreement (strongly disagree and disagree) was 8.40% (12 participants). This suggests that most learners feel their educational goals are being met, indicating that Twitter aids students in meeting their educational goals.

To conclude, the mean score for all items lies between 4.03 and 3.76 within the average mean for all items 3.89 (agree); this shows that respondents largely agree that Twitter has a positive capacity in relation to the learning environment. Thus, Twitter can be seen as a positive tool that can be integrated successfully into the learning environment.

Several participants placed their responses in disagreement (disagree or strongly disagree). Therefore, even though this result showed positive experiences by the vast majority of participants, some participant had negative experiences of the tool.

The researcher aims to run an internal analysis (inferential), attempting to further explore the current findings in terms of categorical data, such as prior online experience and prior Twitter academic experience. Hence, two hypotheses were constructed to explore this further and are listed below.

Is there a statistically significant difference in the positive capacity in terms of the variable: prior online experience?

H0: There are no differences in the positive capacity between students who had prior online experiences and students who had not.

Is there a statistically significant difference in positive capacity in terms of the variable relating prior Twitter academic experience?

H0: There are no differences in positive capacity between students who had prior Twitter academic experience and students who had not.

4.7.5 Fifth factor: Engagement

This section presents the results of the fifth factor, aiming to address the research question, ‘To what extent do students engage *via* social media (Twitter) for educationally relevant purposes?’ For this factor, five items assessed students’ engagement of Twitter in their learning environment; those items were given a rank in descending order according to their mean (M) as shown in Table 4.18. For this factor, the layout of the Likert scale differs to others regarding labelling (very often, often, sometimes, rarely, never).

Table 4.18: Engagement items in descending order according to their mean

N	Tools		Very often	Often	Sometimes	Rarely	Never	Mean	Std. dev.	Rank	Attitude
1	How often do you ask questions or participate in class discussion?	F	34	48	49	13	0	3.72	.93	1	Often
		%	23.6	33.3	34	9	0				
2	How often do you discuss grades or assignments with an instructor <i>via</i> Twitter?	F	33	42	34	18	17	3.39	1.29	2	Sometimes
		%	22.9	29.2	23.6	12.5	11.8				
3	How often do you discuss ideas from your readings or classes with faculty members outside of class?	F	23	30	43	31	17	3.08	1.24	4	Sometimes
		%	16	20.8	29.9	21.5	11.8				
4	How often do you discuss ideas from your readings or classes with others outside of class (students, family members, co-workers, etc.)?	F	28	38	44	25	9	3.35	1.16	3	Sometimes
		%	19.4	26.4	30.6	17.4	6.3				
5	How often do you work with faculty members on activities other than coursework (committees, orientation, student life activities, etc.)?	F	15	40	28	25	36	2.81	1.36	5	Sometimes
		%	10.4	27.8	19.4	17.4	25				
		F	144	Total mean = 3.27 = Sometimes							
		%	100								

The results of this table will be explored in depth by individually presenting the outcome of each item. The mean of students’ responses for the first item (N=1) was 3.72 (often). To elaborate, 23.60% (34) of participants answered, ‘very often’, the portion of participants who responded with ‘often’ was 33.30% (48); the portion of participants responding with ‘sometimes’ was 34.00% (49), and the portion of participants responding with ‘rarely’ was 9.00% (13). Interestingly, no responses were recorded in the ‘never’ column, indicating that all participants must have experienced this activity. The most remarkable result emerging from the data is that participants often engage and ask questions during class discussion. This indicates that learners

put time and effort into asking questions or participating in class discussions *via* Twitter. Participants often engage *via* Twitter for education and therefore, engage in learning activities.

The mean of students' responses in the second item (N=2) was 3.39 (sometimes). In illustration of this, 22.90% (33) of participants answered 'very often'; the portion of participants who responded 'often' was 29.20% (42), the portion of participants who responded with 'sometimes' was 23.60% (34), and the portion of participants who responded with 'rarely' was 9.00% (18). Finally, the portion of participants who responded with 'never' was 11.80% (17). The results revealed that students sometimes discuss grades and assignments with their instructor, whereas a small minority report that they never discuss this with their instructor *via* Twitter.

The mean of students' responses in the third item (N=3) was 3.08 (sometimes). To elaborate, 16.0% (23) participants answered, 'very often', the portion of participants who responded with 'often' was 20.8% (30), the portion of participants who responded with 'sometimes' was 29.9% (43), and the portion of participants who responded with 'rarely' was 21.5% (31). Finally, the portion of participants who responded with 'never' was 11.8% (17). This result indicates that participants are sometimes involved in this activity. Surprisingly, a minority of students have never participated in such activities.

The mean of students' responses for the fourth item (N=4) was 3.35 (sometimes). In illustration of this, 19.40% (28) participants answered, 'very often'; the portion of participants who responded 'often' was 26.40% (38), the portion of participants who responded with 'sometimes' was 30.60% (44), and the portion of participants who responded with 'rarely' was 17.40% (25). Finally, the proportion of participants who responded with 'never' was 6.30% (9). Results showed that students sometimes discuss their ideas with those who are not their instructors or classmates. This could indicate that as social media is an open platform to the public, users sometimes get involved in discussions with non-class members.

The mean of students' responses in the final item (N=5) was 2.81 (sometimes). To clarify this, 10.40% (15) participants answered with, 'very often'; the portion of participants who responded with 'often' was 27.80% (40), the portion of participants who responded with 'sometimes' is 19.40% (28), and the portion of participants who responded with 'rarely' was 17.40% (25). Finally, the portion of participants who responded with 'never' was 25.00% (36). This finding indicates that participants sometimes engage in non-coursework activities. Based on this, only 10.40% (15) of learners work 'very often' while 25.00% (36) of members never get involved in activities that are not related to coursework. Consequently, the current findings showed that even though open and public tools were introduced into classrooms for educational purposes, participation may have been limited to those who were classmates or instructors. This could also indicate that they were not encouraged to engage in such activities or that there were no activities at all related to their interests.

Overall, students ‘often’ ask questions or participate in class discussion; the overall mean score for all items ranged between 3.72 and 2.81, which positions the responses of the participants in the ‘often’ and ‘sometimes’ categories, with the overall mean for all items at 3.27 (sometimes), showing that students sometimes engage in Twitter for educational relevant purposes.

Several participants placed their responses in ‘rarely’ or ‘never’. This indicates that a few students are rarely or never engaged in the learning environment *via* Twitter. Based on this, the researcher aims to run an internal analysis (inferential) to further explore the current findings in terms of categorical data, such as prior online experience and Twitter academic experience. Hence, two hypotheses were constructed to explore this further, these are listed below.

Is there a statistically significant difference in the engagement in terms of the variable: prior online experience?

H0: There are no differences in engagement between students who had prior online experiences and students who had not.

Is there a statistically significant difference in engagement in terms of the variable: prior academic experience in using Twitter.

H0: There are no differences in engagement between students who had prior Twitter academic experience and students who had not.

4.7.6 Sixth factor: Pedagogical potential in higher education (personalisation)

This section presents the results of the fourth factor, aiming to address the research question, ‘To what extent do students believe social media (Twitter) offers pedagogical potential in their learning environment?’ For this factor, three items assessed the pedagogical potential of Twitter in higher education experienced by students in their learning environment. Table 4.19 shows participants’ attitudes towards the positive capacity of Twitter in their learning environment. Items were given a rank in descending order according to their mean (M).

Table 4.19: Personalisation items in descending order according to their mean

N	Tools		Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Mean	Std. dev.	Rank	Attitude
1	Twitter allows me to share my academic interests.	F	56	57	19	5	7	4.04	1.06	3	Agree
		%	38.9	39.6	13.20	3.5	4.9				
2	Twitter allows me to personalise and express individuality and creativity.	F	61	63	15	4	1	4.24	0.802	1	Strongly agree
		%	42.4	43.8	10.4	2.8	0.7				
3	Twitter allows me to hold forums to discuss academic topics of my interest.	F	56	58	25	2	3	4.13	.89	2	Agree
		%	38.90	40.30	17.40	1.40	2.10				
		F	144	Total mean = 4.14 = Agree							
		%	100								

The results of this table will be explored in depth by individually presenting the outcome of each item. The mean of students’ responses for the first item (N=1) was 4.04 (agree). The total agreement (strongly agree and agree) for this item was 78.50% of participants (113), whereas the portion of total disagreement (strongly disagree and disagree) was 8.40% (12 participants). The vast majority of those who responded to this item agreed that Twitter allows them to share their academic interests.

The mean of students’ responses for the second item (N=2) was 4.24 (strongly agree). The total agreement (strongly agree and agree) portion for this item was 86.20% (124) of participants, whereas the total disagreement (strongly disagree and disagree) percentages was 3.50% (5) of participants. this demonstrates that Twitter allows learners to personalise and express their individuality and creativity.

The mean of the final item (N=3) was 4.13 (agree). The total agreement (strongly agree and agree) portion for this item was 79.20% (114) of participants, whereas the total disagreement (strongly disagree and disagree) portion was 3.50% (5) participants. This indicates that learners do get involved in academic discussions related to their topic of interests.

To summarise, the mean score for all items lies between 4.04 and 4.24, with the overall mean for all items at 4.14 (agree), which indicates that respondents agreed with the idea that Twitter has pedagogical potential in higher education. Thus, Twitter is an effective technology that has pedagogical potential in higher education.

A few participants placed their responses in disagreement (disagree or strongly disagree). Therefore, even though the majority of participants had a positive experience, some students had a negative experience of using Twitter in higher education.

Based on this, the researcher aims to run an internal analysis (inferential) to further explore the current findings in terms of categorical data, such as prior online experience and prior Twitter academic experience. Hence, two hypotheses were constructed to explore this further, as listed below.

Is there a statistically significant difference in the pedagogical potential of Twitter in higher education in terms of the variable: prior online experience?

H0: There are no differences in the pedagogical potential of Twitter in higher education between students who had prior online experiences and students who had not.

Is there a statistically significant difference in the pedagogical potential of Twitter in higher education in terms of the variable: prior Twitter academic experience?

H0: There are no differences in the pedagogical potential of Twitter in higher education between students who had prior Twitter academic experience and students who had not.

4.8 Inferential analysis

This section of analysis is important in exploring descriptive findings in more detail. In this section, three variables are tested against factors to discover any differences between the selected groups. The variables are prior online experience, prior Twitter academic experience, and frequency.

To verify the differences between the two groups, a Mann Whitney U test was run using SPSS to determine the difference between them. This test was used because the data are based on ranks (Likert scale); moreover, the data utilised in this study are not normally distributed (non-parametric), therefore, the Mann Whitney U test is the most appropriate test (Cohen *et al.*, 2013; Trajkovski, 2016).

4.8.1 Challenges

In this section, the hypotheses' results are listed in tables and explanations underneath each hypothesis.

Is there a statistically significant difference in the responses to the challenges of using Twitter in terms of the variable: prior online experience?

H0: There are no differences in responses to the challenges between students who had prior online experiences and students who had not.

Table 4.20 summarises the 'challenges' items into two groups, according to prior online experience among the number of students. In addition, the Mann Whitney U test and level of statistical significance are presented. The hypothesis aimed to determine whether students who had prior online experience are significantly different in their perceptions of challenges, from those who had not. To verify this, a Mann Whitney U test was run using SPSS to determine the difference between the two groups.

Table 4.20: Significant difference in the responses to the challenges of using Twitter in terms of the variable: prior online experience, using Mann-Whitney U test

N	Items			Have you ever taken any online courses (offered entirely online without face-to-face interactions)?	Mann-Whitney U test	Asymp. Sig. (2-tailed) P-value
1	I try to think of ways of doing my job (discussions and comments) effectively by using Twitter.	Yes	F	22	1030.5	0.071
		No	F	122		
2	Using Twitter for classroom discussions is very convenient.	Yes	F	22	1085.5	0.126
		No	F	122		
3	Twitter is more effective in the classroom than Blackboard.	Yes	F	22	1152.5	0.264
		No	F	122		
4	I feel more connected with classmates by using Twitter.	Yes	F	22	1172.5	0.322
		No	F	122		
5	I can contact my instructor more often using Twitter compared to when I did not have access to Twitter.	Yes	F	22	1160	0.295
		No	F	122		
6	How would you rate your agreement with the following statement: I acquired personal or professional growth after completing the course.	Yes	F	22	1268.5	0.669
		No	F	122		
7	Twitter promotes knowledge sharing.	Yes	F	22	1208.5	0.42
		No	F	122		
8	Twitter provides collaborative learning opportunities	Yes	F	22	1290	0.758
		No	F	122		
9	The questions and answers on Twitter were very helpful.	Yes	F	22	1193.5	0.375
		No	F	122		
10	I enjoy using Twitter in the classroom for asking questions during lectures.	Yes	F	22	1239	0.541
		No	F	122		
11	Twitter is much more useful for the course than I thought it would be.	Yes	F	22	1245	0.566
		No	F	122		
12	Using Twitter makes learning easier.	Yes	F	22	1162.5	0.287
		No	F	122		
13	Using Twitter improves the quality of courses.	Yes	F	22	1248	0.575
		No	F	122		
14	I believe Twitter benefits my social learning network.	Yes	F	22	1246	0.57
		No	F	122		
15	I feel Twitter should be used more in courses.	Yes	F	22	1332	0.953
		No	F	122		
16	Twitter improves classroom interaction during lectures.	Yes	F	22	1299	0.801
		No	F	122		
17	Twitter improves interaction outside of class lectures.	Yes	F	22	976.5	0.032
		No	F	122		
18	Twitter helped me to learn course materials more effectively.	Yes	F	22	1267	0.664
		No	F	122		
19	Using Twitter has made me feel more comfortable engaging in discussions during class time.	Yes	F	22	1197	0.394
		No	F	122		
20	Twitter has helped me to participate more in debates.	Yes	F	22	1308	0.842
		No	F	122		
21	Twitter helped me to gain a deeper understanding of the debate topic.	Yes	F	22	1324.5	0.917
		No	F	122		
22	Twitter helped to understand the argument of other participants in the debate.	Yes	F	22	1194	0.379
		No	F	122		
23	Twitter helped me to prepare the role I had to play during the face-to-face debate.	Yes	F	22	1069.5	0.112
		No	F	122		
Total		F	144			
		%	100%			
Significance level = 0.05*						

Table 4.20 demonstrates the result of two groups; it indicates that the null hypothesis is supported (i.e. the test fails to reject the null hypothesis) and the p value is higher than 0.05 for all items. There was no evidence to support a difference between the two groups; therefore, students who took prior fully online courses were not statistically significantly different in their responses from those who did not.

Is there a statistically significant difference in responses to the challenges in terms of the variable: prior Twitter academic experience?

H0: There are no differences in challenges between students who had prior Twitter academic experience and students who had not.

Table 4.21 summarises the ‘challenge’ items into two groups according to prior Twitter academic experience among the students the Mann Whitney U test and level of statistical significance are also presented. The hypothesis aimed to determine whether students who had prior Twitter academic experience are significantly different in their perceptions of the challenges from those who had not.

Table 4.21: Significant difference in responses to the challenges in terms of the variable: prior Twitter academic experience, using the Mann-Whiney test

N	Items			Have you ever been involved in courses that utilised Twitter before this class?	Mann-Whitney U test	Asymp. Sig. (2-tailed) P-value
1	I try to think of ways of doing my job (discussions and comments) effectively by using Twitter.	Yes	F	37	1896	0.69
		No	F	107		
2	Using Twitter for classroom discussions is very convenient.	Yes	F	37	1960	0.924
		No	F	107		
3	Twitter is more effective in the classroom than Blackboard.	Yes	F	37	1971	0.967
		No	F	107		
4	I feel more connected with classmates by using Twitter.	Yes	F	37	1979.5	1.00
		No	F	107		
5	I can contact my instructor more often by using Twitter as compared to when I did not have Twitter accessibility.	Yes	F	37	1919	0.775
		No	F	107		
6	How would you rate your agreement with the following statement: I acquired personal or professional growth after completing the course.	Yes	F	37	1844	0.517
		No	F	107		
7	Twitter promotes knowledge sharing.	Yes	F	37	1870	0.586
		No	F	107		
8	Twitter provides collaborative learning opportunities.	Yes	F	37	1735	0.232
		No	F	107		
9	The questions and answers on Twitter were very helpful.	Yes	F	37	1546	0.033*
		No	F	107		
10	I enjoy using Twitter in the classroom for asking questions during lecture.	Yes	F	37	1598	0.062
		No	F	107		
11		Yes	F	37	1902.5	0.707

N	Items			Have you ever been involved in courses that utilised Twitter before this class?	Mann- Whitney U test	Asymp. Sig. (2- tailed) P-value
	Twitter is much more useful for the course than I thought it would be.	No	F	107		
12	Using Twitter makes learning easier.	Yes	F	37	1813.5	0.418
		No	F	107		
13	Using Twitter improves the quality of courses.	Yes	F	37	1621	0.079
		No	F	107		
14	I believe Twitter benefits my social learning network.	Yes	F	37	1840	0.496
		No	F	107		
15	I feel Twitter should be used more in courses.	Yes	F	37	1730.5	0.225
		No	F	107		
16	Twitter improves classroom interaction during lectures.	Yes	F	37	1701	0.178
		No	F	107		
17	Twitter improves interaction outside of class lectures.	Yes	F	37	1931.5	0.817
		No	F	107		
18	Twitter helped me to learn course materials more effectively.	Yes	F	37	1806.5	0.409
		No	F	107		
19	Using Twitter has made me feel more comfortable engaging in discussions during class time.	Yes	F	37	1900.5	0.702
		No	F	107		
20	Twitter helped me to participate more in debate.	Yes	F	37	1951	0.89
		No	F	107		
21	Twitter helped me to deeper understanding the topic in the debate.	Yes	F	37	1707.5	0.181
		No	F	107		
22	Twitter helped to understand the argument of other participants in the debate.	Yes	F	37	1935.5	0.83
		No	F	107		
23	Twitter helped me to prepare the role I had to play in face-to-face debates.	Yes	F	37	1883.5	0.645
		No	F	107		
Total		F	144			
		%	100%			
Significance level = 0.05*						

Table 4.21 demonstrates the result of two groups, indicating that the null hypothesis is supported (i.e. the test fails to reject the null hypothesis) and the p value is greater than 0.05 for all items except item 9. There was, therefore, no evidence to support a difference between the two groups; students who had Twitter academic experience courses are not statistically significantly different from those who had not, excluding item number 9, ‘*The questions and answers in Twitter were very helpful*’, suggesting that prior experience of using Twitter may be helpful in this regard.

Is there a statistically significant difference in the challenges in terms of the variable: frequency (rarely and more than five times a day)?

H0: There is no difference in the challenges between students who use Twitter rarely (less than once a day) and students who use Twitter more than five times a day.

Table 4.22 summarises the ‘challenges’ items into two (more than five times and rarely) groups according to frequency use of Twitter among students; the Mann Whitney U test and level of statistical significance are also presented. The hypothesis aimed to determine whether students

who use Twitter rarely (less than once a day) are significantly different in their perceptions of challenges from those who use Twitter more than five times a day.

Table 4.22: Significant difference in the challenges in terms of the variable: frequency (rarely and more than five times a day), using the Mann-Whitney U test

N	Items	Frequency		Mann-Whitney U test	Asymp. Sig. (2-tailed) P-value	
1	Using Twitter for classroom discussions is very convenient.	F	Rarely	20	231.5	0.001*
		F	More than five times	45		
2	Twitter is more effective in the classroom than Blackboard.	F	Rarely	20	257	0.004*
		F	More than five times	45		
3	I feel more connected with classmates by using Twitter.	F	Rarely	20	279	0.011*
		F	More than five times	45		
4	I can contact my instructor more often by using Twitter as compared to when I did not have access to Twitter.	F	Rarely	20	397.5	0.44*
		F	More than five times	45		
5	Twitter promotes knowledge sharing.	F	Rarely	20	247.5	0.002*
		F	More than five times	45		
6	Twitter provides collaborative learning opportunities.	F	Rarely	20	308.5	0.032*
		F	More than five times	45		
7	I enjoy using Twitter in the classroom for asking questions during lectures.	F	Rarely	20	274.5	0.007*
		F	More than five times	45		
8	Using Twitter improves the quality of courses.	F	Rarely	20	311.5	0.035*
		F	More than five times	45		
9	Twitter helped me to gain a deeper understanding of the debate topic.	F	Rarely	20	309.5	0.034*
		F	More than five times	45		
10	I try to think of ways of doing my job (discussions and comments) effectively using Twitter.	F	Rarely	20	361.5	0.192
		F	More than five times	45		
11	How would you rate your agreement with the following statement: I acquired personal or professional growth after completing the course.	F	Rarely	20	415.5	0.61
		F	More than five times	45		
12	The questions and answers on Twitter were very helpful	F	Rarely	20	330.5	0.069
		F	More than five times	45		
13	Twitter is much more useful for the course than I thought it would be.	F	Rarely	20	345.5	0.108
		F	More than five times	45		
14	Using Twitter makes learning easier.	F	Rarely	20	337.5	0.085
		F	More than five times	45		
15	I believe Twitter benefits my social learning network.	F	Rarely	20	334.5	0.079
		F	More than five times	45		
16	I feel Twitter should be used more in courses.	F	Rarely	20	334.5	0.082
		F	More than five times	45		
17	Twitter improves classroom interaction during lectures.	F	Rarely	20	405	0.498
		F	More than five times	45		
18	Twitter improves interaction outside of class lectures.	F	Rarely	20	363	0.191
		F	More than five times	45		
19	Twitter helped me to learn course materials more effectively.	F	Rarely	20	432	0.788
		F	More than five times	45		
20	Using Twitter has made me feel more comfortable engaging in discussions during class time.	F	Rarely	20	336.5	0.086
		F	More than five times	45		
21	Twitter has helped me to participate more in debates.	F	Rarely	20	401.5	0.468
		F	More than five times	45		
22	Twitter has helped to understand the argument of other participants in debates	F	Rarely	20	344.5	0.108
		F	More than five times	45		
23	Twitter has helped me to prepare the role I had to play in face-to-face debates.	F	Rarely	20	1069.5	0.112
		F	More than five times	45		
Total		F	144			
		%	100%			
Significance level = 0.05*						

Significance level = 0.05*

Table 4.22 shows the result of the two groups (rarely and more than five times); these groups are divided in two different conclusions. First, when the null hypothesis is supported (i.e. the test rejects the null hypothesis), the p value is not greater than 0.05 for the items from N:1 to N:9. Thus, the differences between the two groups were supported for these items, implying that students who used Twitter are rarely statistically significantly different from those who use Twitter more than five times a day.

Second, when the null hypothesis is not supported (i.e. the test fails to reject the null hypothesis), the p value is higher than 0.05 for items ranging from N:10 to N:23. Therefore, the differences between the two groups were not supported for these items, implying that students who used Twitter rarely are not statistically significantly different from those who use Twitter more than five times a day.

Obstacles

In this section, the hypotheses results are listed in tables and explanations underneath each hypothesis.

Is there a statistically significant difference in the perceived obstacles in terms of the variable: prior online experience?

H0: There are no differences in the perceived obstacles between students who had prior online experiences and students who had not

Table 4.23 summarises the obstacle items. The items were divided into two groups according to the prior online experience of participants. The Mann Whitney U test and level of statistical significance are also presented. The hypothesis aimed to determine whether students who had prior online experience are significantly different to those who had none, regarding their perceptions of the obstacles. To verify this, a Mann Whitney U test was run using SPSS to determine the differences between the two groups.

Table 4.23: Significant difference in the perceived obstacles in terms of the variable: prior online experience, using the Mann-Whitney U test

N	Items			Have you ever taken any online courses (offered entirely online without face-to-face interactions)?	Mann-Whitney U test	Asymp. Sig. (2-tailed) P-value
1	Twitter has badly affected my study.	Yes	F	22	1329.5	0.942
		No	F	122		
2	Chatting with my friends distracts my study during lectures.	Yes	F	22	1257	0.624
		No	F	122		
3	I think lack of experience prevents me from using Twitter effectively.	Yes	F	22	1278	0.714
		No	F	122		
4	The information in Twitter is illogically organised and confusing.	Yes	F	22	1282	0.732
		No	F	122		
5	There are accessibility issues within Twitter from time to time.	Yes	F	22	1309	0.85
		No	F	122		
6	Using Twitter for the study requires too much of my time.	Yes	F	22	1252	0.608
		No	F	122		
7	I have a lack of motivation and encouragement from my instructor.	Yes	F	22	1179	0.349
		No	F	122		
8	I am intimidated by the use of technology.	Yes	F	22	1163	0.294
		No	F	122		
9	I do not want to share my private social life with school.	Yes	F	22	1210.5	0.456
		No	F	122		
10	I do not have sufficient access to the internet.	Yes	F	22	1278	0.712
		No	F	122		
Total		F	144			
		%	100%			
Significance level = 0.05						

Table 4.23 demonstrates the result of two groups; it indicates that the null hypothesis is not supported (i.e. the test fails to reject the null hypothesis) and the p value is greater than 0.05 for

all items. There was no evidence to support a difference between the two groups; therefore, students who previously took fully online courses are not statistically significantly different from those who did not, in terms of encountering obstacles.

Is there a statistically significant difference in obstacles in terms of the variable: prior Twitter academic experience?

There are no differences in obstacles between students who had prior Twitter academic experience and students who had none.

Table 4.24 summarises the obstacles items. These items were divided into two groups according to prior Twitter academic experience of students. The Mann-Whitney U test and level of statistical significance are also presented. The hypothesis aimed to determine whether students who had prior Twitter academic experience are significantly different to those who had none, regarding their perceptions of the obstacles. To verify this, a Mann-Whitney U test was run using SPSS to determine the differences between the two groups.

Table 4.24: Significant difference in obstacles in terms of the variable: prior Twitter academic experience, using the Mann-Whitney U test

N	Items			Have you ever been involved in courses that utilised Twitter before this class?	Mann-Whitney U test	Asymp. Sig. (2-tailed) P-value
1	Twitter has badly affected my study.	Yes	F	37	1783.5	0.347
		No	F	107		
2	Chatting with my friends distracts my study during lectures.	Yes	F	37	1843	0.517
		No	F	107		
3	I think lack of experience prevents me from using Twitter effectively.	Yes	F	37	1936.5	0.839
		No	F	107		
4	The information in Twitter is illogically organised and confusing.	Yes	F	37	1648.5	0.12
		No	F	107		
5	There are accessibility issues within Twitter from time to time.	Yes	F	37	1910	0.743
		No	F	107		
6	Using Twitter for the study requires too much of my time.	Yes	F	37	1911.5	0.749
		No	F	107		
7	I have a lack of motivation and encouragement from my instructor.	Yes	F	37	1845.5	0.526
		No	F	107		
8	I am intimidated by the use of technology.	Yes	F	37	1734.5	0.237
		No	F	107		
9	I do not want to share my private social life with school.	Yes	F	37	1796	0.391
		No	F	107		
10	I do not have sufficient access to the internet.	Yes	F	37	1831.5	0.482
		No	F	107		
Total		F	144			
		%	100%			
Significance level = 0.05						

Table 4.24 demonstrates the result of two groups and indicates that the null hypothesis is not supported (i.e. the test fails to reject the null hypothesis) and the p value is higher than 0.05 for all items. Therefore, there is no evidence to support a difference between the two groups; students who had prior Twitter academic experience are not statistically significantly different from those who had none, in terms of encountering obstacles.

4.8.2 Positive capacity of Twitter

In this section, the hypotheses results are listed in tables and explanations are provided underneath each hypothesis.

Is there a statistically significant difference regarding positive capacity in terms of the variable: prior online experience?

H0: There are no differences regarding the positive capacity of Twitter between students who had prior online experience and students who had none.

Table 4.25 summarises items in relation to positive capacity. These items were divided into two groups according to students' prior online experience. The Mann Whitney U test and level of statistical significance were also presented. The hypothesis aimed to determine whether students who had prior online experience are significantly different from those who had none, regarding their perceptions of the positive capacity of Twitter. To verify this, a Mann Whitney U test was run using SPSS to determine the difference between the two groups.

Table 4.25: Significant difference in the Positive capacity in terms of the variable: prior online experience, using Mann-Whitney U test

N	Tools			Have you ever taken any online courses (offered entirely online without face-to-face interactions)?	Mann-Whitney U test	Asymp. Sig. (2-tailed) P-value
1	Twitter allows me to find and share educational resources.	Yes	F	22	1260	0.629
		No	F	122		
2	Twitter allows me to communicate with classmates about course-related topics.	Yes	F	22	1288	0.753
		No	F	122		
3	I am encouraged to ask questions <i>via</i> Twitter.	Yes	F	22	1327.5	0.932
		No	F	122		
4	My educational goals are being met.	Yes	F	22	1241	0.557
		No	F	122		
Total		F	144			
		%	100%			
Significance level = 0.05						

Table 4.25 demonstrates the result of two groups; it indicates that the null hypothesis is not supported (i.e. the test fails to reject the null hypothesis), the p value is greater than 0.05 for all items. There is no evidence to support a difference between the two groups; therefore, students who previously took fully online courses are not statistically significantly different from those who did not.

Is there a statistically significant difference in the positive capacity of Twitter in terms of the variable: prior Twitter academic experience?

H0: There are no differences in positive capacity between students who had prior Twitter academic experience and students who had none.

Table 4.26 summarises the positive capacity items. These items were divided into two groups according to students' prior academic experience of Twitter. Furthermore, the Mann Whitney U test and level of statistical significance were presented. The hypothesis aimed to determine whether students who had prior Twitter academic experience are significantly different from those who had none, regarding their perceptions of the positive capacity of Twitter. To verify this, a Mann Whitney U test was run using SPSS to determine the differences between the two groups.

Table 4.26: Significant differences in positive capacity in terms of the variable: prior Twitter academic experience, using the Mann-Whitney U test

N	Tools			Have you ever been involved in courses that utilised Twitter before this class?	Mann-Whitney U test	Asymp. Sig. (2-tailed) P-value
1	Twitter allows me to find and share educational resources.	Yes	F	37	1714.5	0.198
		No	F	107		
2	Twitter allows me to communicate with classmates about course-related topics.	Yes	F	37	1663.5	0.129
		No	F	107		
3	I am encouraged to ask questions <i>via</i> Twitter.	Yes	F	37	1934	0.826
		No	F	107		
4	My educational goals are being met.	Yes	F	37	1579	0.055
		No	F	107		
Total		F	144			
		%	100%			
Significance level = 0.05						

Table 4.26 demonstrates the results for the two groups. It indicates that the null hypothesis is not supported (i.e. the test fails to reject the null hypothesis) and the p value is greater than 0.05 for all items. There is no evidence to support a difference between the two groups; therefore, students who had Twitter academic experience courses are not statistically significantly different from those who had not.

4.8.3 Engagement

In this section, the hypotheses results are listed in tables and explanations underneath each hypothesis.

Is there a statistically significant difference in engagement in terms of the variable: prior online experience?

H0: There are no differences in engagement between students who had prior online experiences and students who had none.

Table 4.27 summarises the engagement items. These items were divided into two groups according to students' prior online experience. The Mann Whitney U test and level of statistical significance are also presented. The hypothesis aimed to determine whether the engagement of students who had prior online experience are significantly different from those who had none. To verify this, a Mann Whitney U test was run using SPSS, to determine the difference between the two groups.

Table 4.27: Significant difference in the engagement in terms of the variable: prior online experience, using Mann-Whitney U test

N	Tools			Have you ever taken any online courses (offered entirely online without face-to-face interactions)?	Mann-Whitney U test	Asymp. Sig. (2-tailed) P-value
1	How often do you ask questions or participate in class discussion?	Yes	F	22	880	0.007*
		No	F	122		
2	How often do you discuss grades or assignments with an instructor <i>via</i> Twitter?	Yes	F	22	1132.5	0.232
		No	F	122		
3	How often do you discuss ideas from your reading or classes with faculty members outside of class?	Yes	F	22	1271.5	0.688
		No	F	122		
4	How often do you discuss ideas from your reading or classes with others outside of class (students, family members, co-workers, etc.)?	Yes	F	22	1324	0.918
		No	F	122		
5	How often do you work with faculty members on activities other than coursework (committees, orientation, student life activities, etc.)?	Yes	F	22	1268	0.673
		No	F	122		
Total		F	144			
		%	100%			
Significance level = 0.05*						

Table 4.27 shows that there are two different conclusions. First, when the null hypothesis is supported (i.e. the test rejects the null hypothesis), the p value is not greater than 0.05 for the item N:1. Thus, the differences between the two groups are supported for this item, implying that

students who took prior fully online courses are statistically significantly different from those who did not.

Second, when the null hypothesis is not supported (i.e. the test fails to reject the null hypothesis), the p value is higher than 0.05 for items ranging from N:2 to N:5. Therefore, the differences between the two groups were not supported for this item, implying that students who took prior fully online courses are not statistically significantly different from those who did not.

Is there a statistically significant difference in engagement of students regarding the variable: prior Twitter academic experience?

H0: There are no differences in engagement between students who had prior Twitter academic experience and students who had none.

Table 4.28 summarises the engagement items. These items were divided into two groups according to students' prior Twitter academic experience within the number of students. The Mann Whitney U test and level of statistical significance were also presented. The hypothesis aimed to determine whether the engagement of students who had prior Twitter academic experience is significantly different from those who had none. To verify this, a Mann Whitney U test was run using SPSS to determine the differences between the two groups.

Table 4.28: Significant differences in engagement in terms of the variable: prior Twitter academic experience, using the Mann-Whitney U test

N	Tools			Have you ever been involved in courses that utilised Twitter before this class?	Mann-Whitney U test	Asymp. Sig. (2-tailed) P-value
1	How often do you ask questions or participate in class discussion?	Yes	F	37	1810	0.416
		No	F	107		
2	How often do you discuss grades or assignments with an instructor <i>via</i> Twitter?	Yes	F	37	1377	0.005*
		No	F	107		
3	How often do you discuss ideas from your reading or classes with faculty members outside of class?	Yes	F	37	1547.5	0.043
		No	F	107		
4	How often do you discuss ideas from your reading or classes with others outside of class (students, family members, co-workers, etc.)?	Yes	F	37	1921	0.783
		No	F	107		
5	How often do you work with faculty members on activities other than coursework (committees, orientation, student life activities, etc.)?	Yes	F	37	1767.5	0.32
		No	F	107		
Total		F	144			
		%	100%			
Significance level = 0.05*						

Table 4.28 demonstrates the result of two groups, indicating that there are two different conclusions. First, when the null hypothesis is supported (i.e. the test rejects the null hypothesis), the p value is not greater than 0.05 for the item N:2. Thus, the differences between the two groups are supported for this item, indicating that students who had prior Twitter academic experience are statistically significantly different from those who had none.

Second, when the null hypothesis is not supported (i.e. the test fails to reject the null hypothesis), the p value is higher than 0.05 for the other items. Therefore, the differences between the two groups are not supported for this item, indicating that students who had prior Twitter academic experience are not statistically significantly different from those who had none.

4.8.4 Disadvantages of Twitter

In this section, the hypotheses results are listed in tables and explanations are provided underneath each hypothesis.

Is there a statistically significant difference in the disadvantages of using Twitter in terms of the variable: prior online experience?

H0: There are no differences in the disadvantages of using Twitter between students who had prior online experience and students who had none.

Table 4.29 summarises items regarding the disadvantages of Twitter. These items were divided into two groups according to the prior online experience of students. The Mann Whitney U test and level of statistical significance were presented. The hypothesis aimed to determine whether students who had prior online experience are significantly different from those who had none, regarding their perceptions of the disadvantages of Twitter. To verify this, a Mann Whitney U test was run using SPSS to determine the differences between the two groups.

Table 4.29: Significant differences in students' perceptions of the disadvantages of Twitter in relation to the variable: prior online experience, using the Mann-Whitney U test

N	Tools			Have you ever taken any online courses (offered entirely online without face-to-face interactions)?	Mann-Whitney U test	Asymp. Sig. (2-tailed) P-value
1	Twitter was a distraction to learning on the course.	Yes	F	22	1294	0.782
		No	F	122		
2	Twitter has inhibited my participation in the debate.	Yes	F	22	1131	0.228
		No	F	122		
3	Twitter has not helped me to understand the topic and argument in the debate.	Yes	F	22	920.5	0.016*
		No	F	122		
4	Twitter has caused more confusion than understanding.	Yes	F	22	1033	0.076
		No	F	122		
Total		F	144			
		%	100%			
Significance level = 0.05						

Table 4.29 demonstrates the result of two groups, indicating that there are two different conclusions. First, when the null hypothesis is supported (i.e. the test rejects the null hypothesis), the p value is not greater than 0.05 for the item N:3. Thus, the differences between the two groups are supported for this item, indicating that students who had prior online academic experience are statistically significantly different to those who had none.

Second, when the null hypothesis is not supported (i.e. the test fails to reject the null hypothesis), the p value is higher than 0.05 for the other items. Therefore, the differences between the two

groups are not supported for this item, indicating that students who had prior online academic experience are not statistically significantly different to those who had none.

Is there a statistically significant difference in students' perceptions of the disadvantages of Twitter in relation to the variable: prior Twitter academic experience?

There are no differences in students' perceptions of the disadvantage of Twitter between those who had prior Twitter academic experience and those who had none.

Table 4.30 summarises the items relating to the disadvantages of Twitter. These items were divided into two groups according to students' prior Twitter academic experience. The Mann Whitney U test and level of statistical significance were also presented. The hypothesis aimed to determine whether students who had prior Twitter academic experience are significantly different from those who had none, in relation to their perceptions of the disadvantages of Twitter. To verify this, a Mann Whitney U test was run using SPSS to determine the differences between the two groups.

Table 4.30: Significant differences in students' perceptions of the disadvantage of Twitter in terms of the variable: prior Twitter academic experience, using the Mann-Whitney U test

N	Items			Have you ever been involved in courses that utilised Twitter before this class?	Mann- Whitney U test	Asymp. Sig. (2-tailed) P-value
1	Twitter was a distraction to learning in the course.	Yes	F	37	1790.5	0.37
		No	F	107		
2	Twitter has inhibited my participation in the debate.	Yes	F	37	1847	0.533
		No	F	107		
3	Twitter has not helped me at all to understand the topic and argument in the debate.	Yes	F	37	1868.5	0.6
		No	F	107		
4	Twitter has caused more confusion than understanding.	Yes	F	37	1786	0.359
		No	F	107		
Total		F	144			
		%	100%			
Significance level = 0.05						

Table 4.30 demonstrates the result of two groups and indicates that the null hypothesis is not supported (i.e. test fails to reject the null hypothesis) and the p value is higher than 0.05 for all items. There is no evidence to support a difference between the two groups; therefore, students who had Twitter academic experience are not statistically significantly different to those who had none.

4.8.5 Pedagogical potential

In this section, the hypotheses results are listed in tables and explanations are provided underneath each hypothesis.

Is there a statistically significant difference in the pedagogical potential of Twitter in higher education in terms of the variable: prior online experience?

H0: There are no differences in pedagogical Potential of Twitter in higher education between students who had prior online experiences and students who had none.

Table 4.31 summarises the pedagogical potential of Twitter in higher education. These items were divided into two groups according to students' prior online experience. The Mann Whitney U test and level of statistical significance were also presented. The hypothesis aimed to determine whether the perceptions of students with prior online experience are significantly different to those who had none, in relation to the pedagogical potential of Twitter in higher education. To verify this, a Mann Whitney U test was run using SPSS to determine the differences between the two groups.

Table 4.31: Significant difference in pedagogical potential of Twitter in higher education in terms of the variable: prior online experience, using the Mann-Whitney U test

N	Tools			Have you ever taken any online courses (offered entirely online without face-to-face interactions)?	Mann-Whitney U test	Asymp. Sig. (2-tailed) P-value
1	Twitter allows me to share my personal interests.	Yes	F	22	1089.5	0.134
		No	F	122		
2	Twitter allows me to personalise and express my individuality and creativity.	Yes	F	22	1283.5	0.723
		No	F	122		
3	Twitter allows me to hold forums to discuss topics of interest.	Yes	F	22	1247.5	0.574
		No	F	122		
Total		F	144			
		%	100%			
Significance level = 0.05						

Table 4.31 demonstrates the result of two groups and indicates that the null hypothesis is not supported (i.e. test fails to reject the null hypothesis) and the p value is higher than 0.05 for all items. There is no evidence to support a difference between the two groups; therefore, students who took prior fully online courses are not statistically significantly different to those who did not.

Is there a statistically significant difference in the pedagogical potential of Twitter in higher education in terms of the variable: prior Twitter academic experience?

H0: There are no differences in the pedagogical potential of Twitter in higher education between students who had prior Twitter academic experience and students who had none.

Table 4.32 summarises the pedagogical potential of Twitter in higher education. These items were divided into two groups according to students' prior Twitter academic experience. The Mann Whitney U test and level of statistical significance were also presented. The hypothesis aimed to determine whether students who had prior Twitter academic experience are significantly different from those who had not in their perceptions of the pedagogical potential of Twitter in higher education. To verify this, a Mann Whitney U test was run using SPSS to determine the differences between the two groups.

Table 4.32: Significant differences in the pedagogical potential of Twitter in higher education in terms of the variable: prior Twitter academic experience, using the Mann-Whitney U test

N	Tools			Have you ever been involved in courses that utilised Twitter before this class?	Mann-Whitney U test	Asymp. Sig. (2-tailed) P-value
1	Twitter allows me to share my personal interests.	Yes	F	37	1663.5	0.123
		No	F	107		
2	Twitter allows me to personalise and express individuality and creativity.	Yes	F	37	1826.5	0.445
		No	F	107		
3	Twitter allows me to hold forums to discuss topics of interest.	Yes	F	37	1782.5	0.334
		No	F	107		
Total		F	144			
		%	100%			
Significance level = 0.05						

Table 4.32 demonstrates the result of the two groups and indicates that the null hypothesis is not supported (i.e. test fails to reject the null hypothesis) and the p value is higher than 0.05 for all items. There is no evidence to support a difference between the two groups; therefore, students who had prior Twitter academic experience are not statistically significantly different from those who had none.

Table 4.33: Summary of factors of the statistically significant and non-significant differences

N	Factors	Prior online experience	Prior Twitter academic experience	Frequency
1	Challenges	Non-significant differences	Statistically significant differences in favour of item 9	Statistically significant differences in favour of items from 1 to 9
2	Obstacles	Non-significant differences	Non-significant differences	
3	Positive capacity	Non-significant differences	Non-significant differences	
4	Engagement	Statistically significant differences only in favour of item 1	Statistically significant differences only in favour of item 2	
5	Disadvantages of Twitter	Significant differences only in favour of item 3	Non-significant differences	
6	Personalisation	Non-significant differences	Non-significant differences	

To conclude, running a Mann Whitney U test for all factors determined the differences between groups in relation to some demographic variables such as prior academic online experience, prior Twitter academic experience, and frequency.

Regarding prior academic online experiences and prior Twitter academic experience, there were no significant differences between the two groups in nearly all of the items. This indicates that students appear to be ready for the use of social media in their learning as non-prior or prior experience has no influence on the integration of Twitter into the learning environment. In addition, this could add value to Twitter in terms of pedagogical potential as instructors may not need to worry about students who have not previously experienced online courses or Twitter for academic usage, or even the use of different technology.

However, for the challenges factor, differences do exist in relation to frequency (rarely and more than five times a day). Students who used Twitter more than five times a day are significantly different to those who rarely used Twitter. Differences were found in relation to the following items:

- Using Twitter for classroom discussions is very convenient;
- Twitter is more effective in the classroom than Blackboard;
- I feel more connected with classmates by using Twitter;
- I can contact my instructor more often using Twitter compared to when I did not have access to Twitter;
- Twitter promotes knowledge sharing;

- Twitter provides collaborative learning opportunities;
- I enjoy using Twitter in the classroom for asking questions during lectures;
- Using Twitter improves the quality of courses; and
- Twitter helps me to gain a deeper understanding of the debate topic.

It can be argued that the more a technology is used, the more familiar with it one becomes, therefore, gaining its benefits. Consider one item as an example: 'Using Twitter for classroom discussions is very convenient'. Heavy users are more likely to familiarise themselves with classroom discussion *via* Twitter.

4.9 The validity and reliability of the questionnaire

In the methodology chapter, the validity and reliability of the questionnaire was discussed in depth. In addition, the Statistical Package for Social Science (SPSS) was used to test the questionnaire's validity and reliability. Comprehensive attention was given to validity and reliability because obtaining scientific acceptance relies on the instrument being valid and reliable (Carmines & Zeller, 1979). Through the SPSS, exploratory factors were analysed; the Spearman coefficient was used to assess the questionnaire's validity; and Cronbach's alpha was utilised to compute all questionnaire dimensions to determine the questionnaire's reliability.

4.9.1 Validity

Further to the discussion in the methodology chapter, according to Cohen *et al.* (2013), validity can be demonstrated using different approaches, including convergent validity. Convergent validity is accomplished 'when two related or similar factors or elements of a particular construct are shown by measures or indicators to be related or similar to each other..... Measures of correlation, regression or factor analysis are often used in quantitative research to demonstrate convergent validity' (Cohen *et al.*, 2013, p. 189). The measure of correlation was approached by conducting Spearman's coefficient of correlation between each item and its dimension total scores were computed.

Using the Spearman rank order correlation is an alternative to Pearson when the assumptions of the parametric statistical test are not met. The Spearman 'assesses the relationship between two sets of true ranked scores' (P. Y. Chen & Popovich, 2002, p. 31). Since the data are ordinal (rank) nonparametric, the Spearman coefficient is the appropriate test for measuring the relationship between the selected variables (Bettany-Saltikov & Whittaker, 2014; P. Y. Chen & Popovich, 2002; Trajkovski, 2016).

Table 4.34 shows the Spearman coefficient of correlation between each item and the total score of the challenges dimension. It appears that the values of correlation coefficient for all items lies between (0.524 to 0.825), with 1% level of significance. Thus, the strength of correlation fluctuates between moderate and very strong, which means that all items contribute positively in the total score of dimension.

Table 4.34: The correlation between the items and the total score of the challenges dimension, using the Spearman coefficient

Item no	Spearman	Sig.	Item no	Spearman	Sig.
1	.524	.000	13	.758	.000
2	.723	.000	14	.764	.000
3	.652	.000	15	.690	.000
4	.672	.000	16	.692	.000
5	.714	.000	17	.688	.000
6	.702	.000	18	.758	.000
7	.615	.000	19	.773	.000
8	.604	.000	20	.774	.000
9	.606	.000	21	.732	.000
10	.727	.000	22	.776	.000
11	.757	.000	23	.632	.000
12	.825	.000			
Correlation is significant at the 0.01 level (2-tailed)					

Table 4.35 shows the Spearman coefficient of correlation between each item and the total score of the obstacles dimension. It appears that the values of correlation coefficient for all items lies between (0.598 to 0.815), with 1% level of significance. Thus, the strength of correlation fluctuates between moderate and very strong, which means that all items contribute positively in the total score of dimension.

Table 4.35: The correlation between of the obstacles dimension, using the Spearman coefficient

Item no	Spearman	Sig.	Item no	Spearman	Sig.
1	.639	.000	13	.716	.000
2	.717	.000	14	.674	.000
3	.699	.000	15	.716	.000
4	.649	.000	16	.598	.000
5	.815	.000	17	.623	.000
Correlation is significant at the 0.01 level (2-tailed)					

Table 4.36 shows the Spearman coefficient of correlation between each item and the total score of the disadvantages of Twitter dimension. It appears that the values of correlation coefficient for all items lies between (0.691 to 0.864), with 1% level of significance. Thus, the strength of

correlation fluctuates between strong and very strong, which means that all items contribute positively in the total score of dimension.

Table 4.36: The correlation between item and total score of the disadvantages of Twitter dimension, using the Spearman coefficient

Item no	Spearman	Sig.
1	.691	.000
2	.779	.000
3	.864	.000
4	.858	.000
Correlation is significant at the 0.01 level (2-tailed)		

Table 4.37 shows the Spearman coefficient of correlation between each item and the total score of the positive capacity of Twitter. It appears that the values of correlation coefficient for all items lies between (0.731 to 0.856), with 1% level of significance. Thus, the strength of correlation fluctuates between strong and very strong, which means that all items contribute positively in the total score of dimension.

Table 4.37: The correlation between item and total score of the positive capacity of Twitter dimension, using the Spearman coefficient

Item no	Spearman	Sig.
1	.835	.000
2	.833	.000
3	.731	.000
4	.856	.000
Correlation is significant at the 0.01 level (2-tailed)		

Table 4.38 shows the Spearman coefficient of correlation between each item and the total score of the engagement. It appears that the values of correlation coefficient for all items lies between (0.573 to 0.837), with 1% level of significance. Thus, the strength of correlation fluctuates between moderate and very strong, which means that all items contribute positively in the total score of dimension.

Table 4.38: The correlation between item and total score of the engagement dimension, using the Spearman coefficient

Item no	Spearman	Sig.
1	.573	.000
2	.747	.000
3	.837	.000
4	.775	.000
5	.810	.000
Correlation is significant at the 0.01 level (2-tailed)		

Table 4.39 shows the Spearman coefficient of correlation between each item and the total score of the pedagogical potential. It appears that the values of correlation coefficient for all items lies between (0.833 to 0.852), with 1% level of significance. Thus, the strength of correlation is very strong, which means that all items contribute positively in the total score of dimension.

Table 4.39: The correlation between item and total score of the pedagogical potential, using the Spearman coefficient

Item no	Spearman	Sig.
1	.834	.000
2	.852	.000
3	.833	.000
Correlation is significant at the 0.01 level (2-tailed)		

4.9.1.1 Construct validity

The discussion in the earlier methodology chapter, along with the earlier discussion in this chapter, confirms the construct validity of the questionnaires. To illustrate this, all the extracted factors had Eigenvalues of 1 and all items were loaded individually in their related factors (loading of > 0.40) along with no cross-load (D. Straub *et al.*, 2004). Therefore, construct validity is established

4.9.2 Reliability

As discussed in the previous methodology chapter, the notion of correlation is an essential aspect in estimating and understanding reliability (P. Y. Chen & Popovich, 2002). To demonstrate internal consistency, the Cronbach's alpha was conducted, which is the common test used for gauging internal reliability. Essentially, the score varies between a score of 1 (indicating perfect internal reliability) and a score of 0 (indicating no internal reliability) (Bryman, 2015). The score 0.80 is generally applied as a rule of thumb to indicate 'an acceptable level of internal reliability' (Bryman, 2015, p. 158). Nonetheless, many researchers accept a figure slightly lower than 0.80 (Bryman, 2015).

In this questionnaire, all the factors have a high value of Cronbach's alpha, as shown in Table 4.40, whereby the values of internal consistency are presented for six dimensions. The result of Cronbach's alpha for dimensions fluctuated between 0.773 and 0.959 is evident, which indicates that all dimensions are very reliable. Furthermore, the total result for all dimensions together is 0.913 and this outcome is closer to one. Consequently, the questionnaire is a reliable and acceptable instrument to measure the research phenomenon.

Table 4.40: Reliability

N	Dimensions	Number of items	Cronbach's alpha (coefficient)
1	Challenges	22	0.959
2	Obstacles	10	0.881
3	Disadvantages of Twitter	4	0.823
4	Positive capacity of Twitter	4	0.852
5	Engagement	5	0.809
6	Pedagogical potential (personalisation)	3	0.773
7	All dimensions	48	0.913

Chapter 5: Qualitative data analysis and results

5.1 The second phases: Semi structured interview

5.2 Introduction

This section presents the qualitative data obtained from the interviews. It begins by describing the process of pre-conducting the interview, then provides a simple explanation related to the interview sample and the conduction of the actual interview. Thereafter, the process of transcription and analysing data are described. In addition, this section highlights the procedure used to verify the research instrument then concludes by reporting the interview findings.

5.3 Stages of conducting interviews

In the literature, there seems to be no standard technique or fixed set of existing rules for conducting all stages of a research interview (Kvale, 2007). Therefore, in the current research, the interview follows the seven stages suggested by Kvale (2007): the recommended seven-stage steps for an interview inquiry, commencing from the initial idea and extending to the final report. This procedure is a direct and meaningful method of conducting interviews as it clarifies the entire process. These stages are summarised below:

Thematising stage: The aim of the research and its underlying concepts have to be formulated prior to beginning the interviews (the why and the what);

Designing stage: Planning the steps and procedures for all stages of the interview (the how);

Interviewing stages: Commencing the actual interview;

Transcribing stage: Preparing and collecting interview materials for analysis, involving transcription from oral speech to writing text;

Analysing stage: Determining the most suitable analysis techniques;

Verifying stage: Ascertaining the validity, generalisability, and reliability of the results; and

Reporting stage: Communicating the results of the study and interview procedure.

5.3.1 Thematising stage

At this stage, the aim of the semi-structured interview is clarified. Since the interview is considered to be a second main method of the current research (follow-up), its main purpose is to obtain in-depth detail to enrich the answers to the research questions, highlight any unexpected results, explain the quantitative findings, and providing possible examples.

5.3.2 Designing stage

At this stage, the entire interview procedure is planned and prepared, including the formulation of semi-structured interview questions. The original questionnaire dimensions were utilised to cover interview topics. The first page of the interview documents was designed to explain the aim of the interviews and the statement guaranteeing the confidentiality of the participants.

5.3.3 Sample

According to Cohen, Manion, and Morrison (2007) the number of interviewees and interviews highly depends on the purpose of the interview, such as providing in-depth details, generalisations, or gaining a range of responses. Kvale (2007, p. 43) acknowledged the need to 'Interview as many subjects as necessary to find out what you need to know.' In the current research, the number of interviewees was not as originally planned. Even though the planned number of interviewees was between 15 and 20 participants, only 10 interviews were eventually carried out. The interview sample was purposive due to the fact that the essential objective of the interview was to obtain in-depth details to enrich the answers to the research questions, highlight any unexpected results, and explain the quantitative findings. The sample includes only males who participated in the primary research method questionnaire. The number of interviewees seems sufficient for the researcher's needs.

5.3.4 Procedure of selecting the interviewees

After completing the questionnaires, the researcher manually distributed papers, allowing students who were willing to participate in the next phase (interview) to provide their details (suitable time, their email, Twitter account, or phone number) for further contact.

5.3.5 Interviewing stages

At this stage, the actual interview commenced. The overall period allocated for the interviews was approximately two weeks, according to participants' preferences. During the interview period, there were two crucial aspects: one during and the other after the interview. The first aspect was the location of the interview; as recommended by Bryman (2015), it is highly advised that the researchers familiarise themselves with the setting of the interviews, ascertain the area is private and quiet so it does not interfere with the interviewees' concentration. Thus, the researcher reserved a room for the execution of the interview. The second aspect was note-taking after the conducting the interview, which took into consideration the following steps indicated by (Bryman, 2015, p. 472).

- How the interview went (talkative, nervous, cooperative);
- The place of the interview;
- Any other feelings about the interview (new avenues of interest); and
- The setting (quiet, busy).

The interviews began by welcoming and thanking the volunteers for their time. The purpose of the study and interview was then explained. Thereafter, the researcher introduced himself and explained the purposes of the interview. During this time, the researcher informed and discussed the ethical issues involved, including confidentiality and consent.

The interviews were recorded, and permission to do so was gained prior to beginning the interview. An iPhone was used to record the interviews alongside a portable charger. Using a personal mobile to record the interview results has several benefits, such as being able to directly transfer the recorded files to the computer for storage and analysis, with relatively little trouble. Therefore, in using computer facilities, the actions needed, such as to speed up, jot down, or stop the records, was easily done.

However, applying voice recordings has the disadvantage of not expressing the visual aspects of the interview. It must be noted that conducting video recordings, although providing non-verbal communication and rich information, is very time-consuming (Cohen *et al.*, 2013). Thus, audio-recording interviews was preferred and appropriate for the current research as video recordings were not needed.

5.3.6 Transcribing stage

This is a crucial stage when interviewing, it includes transforming the interview from oral to written mode, which is fit for analysis. Cohen *et al.* (2013) pointed out that, during the transcribing of the interview, there is a high possibility of extensive data loss and distortion. They acknowledged that the interview is not merely a data collection procedure, but is also a social encounter (Cohen *et al.*, 2013).

Even though interview is contextually rich and dynamic, transcriptions are abstracted and frozen (Cohen *et al.*, 2013). Consequently, Kvale (1996) admits that the transcribing process has an element of interpretation, because ‘every transcription from one context to another involves a series of judgments and decisions’ (Kvale, 1996, p. 163).

It can be said that there is no ‘single correct transcription’, as it depends on how useful it is for the research (Cohen *et al.*, 2013; Kvale, 2007). Thus, the style of transcription might be dissimilar depending on the intention of the transcription. Cohen *et al.* (2013, p. 426) support that ‘the words in transcripts are not necessarily as solid as they were in the social setting of the interview’. This view can be argued against accomplishing reliability. Nevertheless, Scheurich (1995), cited in Cohen *et al.* (2013, p. 427), states that ‘even conventional procedures for achieving reliability are inadequate here, for holding constant the questions, the interviewer, the interviewee, the time and place does not guarantee stable, unambiguous data’.

In this context, the interviews could be transcribed and condensed, or verbatim and summarised.

5.3.6.1 The process of transcription

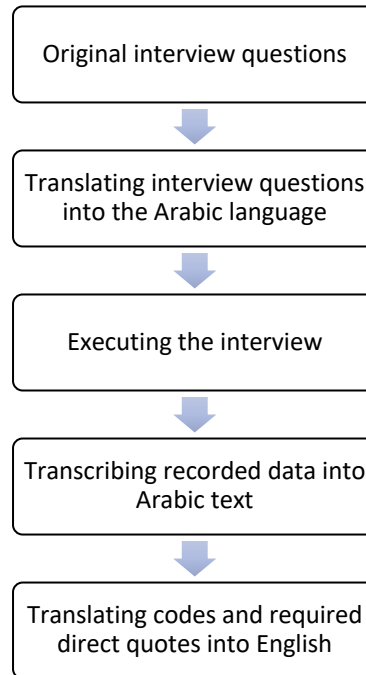
Even though the study of this research is conducted in the English language, the target sample is comprised of Arabic language speakers. Therefore, as discussed in the methodology chapter, the interview was prepared in the English language and then translated into Arabic to execute the investigation. The interview conversation was conducted in the Arabic language.

The interviews were then transcribed into Arabic text. The fundamental reasons for this approach was to send a transcription of the interviews to some of the participants to check whether the researchers had represented their ideas correctly or if any misrepresentation had occurred. Additionally, participants were Arabic speakers.

While transcribing the recorded data, the written text was repeated and checked carefully, together with summarising and condensing the data. Producing written Arabic texts results in needing to translate the needed codes and direct quotations into the English language. The process of

translating the language was exactly the same process as the one followed for the questionnaire's translation. Importantly, the researcher considered the forms or phrases that convey meaning in the Arabic language and ensured these were translated correctly (see Figure 5.1).

Figure 5.1: The process of transcription



5.3.7 Analysis stage

During this step, the meaning is created and derived from the transcribed data. It seems that there is no fixed role or procedure to follow during the analysis stage. Cohen *et al.* (2013, p. 427) proposed some steps in analysing interview data, including:

- Generating natural units of meaning;
- Classifying, categorising and ordering these units of meaning;
- Structuring narratives to describe the interview contents; and
- Interpreting the interview data.

Another approach to analysing interview data is characterised by Kvale (2007), who describes four general modes of interview analysis focusing on meaning, language, bricolage, and theoretical reading. To analyse the current interview, the first mode, which focuses on meaning, was adopted, particularly as a condensation method of analysis. Condensation ‘entails an

abridgement of the meanings expressed by the interviewees into shorter formulations' (Kvale, 2007, p. 106). This type of analysis can be considered as the most appropriate for this study, as this method fits in the explanatory mixed-method procedures. Moreover, the condensation method is deemed to be descriptive approach because it presents participants' experiences as they are described (Malterud, 2012).

5.3.7.1 Organising and presenting data analysis

There are no correct or solitary ways to organise, present, and analyse qualitative data. It is highly determined by the purpose of the analysis and the researcher's needs (Bryman, 2015; Cohen *et al.*, 2013).

Cohen *et al.* (2013) propose seven ways of organising and presenting data analysis. These methods are presented below:

- First and second methods *via* people, such as groups or individuals;
- Third method *via* issues and theme;
- Fourth method *via* research questions;
- Fifth method *via* instruments;
- Sixth method *via* case studies; and
- Seventh method *via* narrative account.

In the current research, the analysis procedures follow the fourth method, organising and presenting data analysis *via* research questions. This approach is a helpful technique because it allows the researcher to gather all the related data for the exact matter of concern. Moreover, using the chosen method enables the researcher to gather all related data from interviews to support a questionnaire's finding (preliminary data). Therefore, the collected data leads to the provision of 'a collective answer to a research question' (Cohen *et al.*, 2013, p. 552) compared to alternative organisation approaches. Therefore, organising and presenting data analysis *via* research questions seems to be systemised; for instance, the questionnaire's result followed by the interview findings.

5.3.7.2 Summary of coding procedures

Coding is a fundamental feature of qualitative research analysis (Cohen *et al.*, 2013; Flick, 2014; Gibbs, 2007). To code the interview, the researcher tracked suggestions and steps proposed by Cohen *et al.* (2013) and Flick (2014), for instance, the code definition and code properties, such

as, ‘keep as discrete’, ‘start earlier than later’, ‘abbreviation that provides clues’, and ‘consistency and repetition of tasks’ (read and reread the transcribed texts).

There are different several coding steps in the interview process, beginning with ‘open coding’, then ‘analytic coding’, ‘axial coding’ and finally ‘selective coding’ (Cohen *et al.*, 2013; Flick, 2014). Even though the interview went through the previously mentioned phases to find any emerging themes, the procedure of ‘concept-driven coding’ is the focus.

Gibbs (2007) demonstrated the source of concepts in the ‘concept-driven data’ approach as they derive from topics in the interview schedule, previous studies, and research literature. Ritchie, Lewis, Nicholls, and Ormston (2013) advocate, in their framework analysis, that the investigator is encouraged to create a series of key thematic ideas. Certainly, all authors emphasise that, during the analysis stage, investigators need to update and change their list of codes due to the fact that new emerging ideas are discovered in the text (see appendix I).

5.3.8 Verifying stage

Obtaining high-quality data is a fundamental aspect for qualitative researchers. High-quality data refers to data being ‘reliable and valid’ (Kumar, 2014). Nevertheless, even though the terms of validity and reliability are applied to evaluate the quality of quantitative research, qualitative investigators highlight their relevance to qualitative studies (Bryman, 2015; King & Horrocks, 2010; Richards, 2009). For instance, in quantitative studies, reliability indicates that it is more likely to have the same result when the measurement is replicated, which is hard to accomplish in qualitative research as replicating social settings seems impossible (Bryman, 2015). For such reasons, qualitative investigators prefer to apply alternative criteria to achieve research quality (Shenton, 2004).

The terms ‘trustworthiness’ and ‘authenticity’ were proposed as two main criteria for judging the quality of qualitative studies (E. G. Guba & Lincoln, 1994). Trustworthiness encompasses credibility, transferability, dependability, and confirmability (Bryman, 2015; E. G. Guba & Lincoln, 1994; Shenton, 2004). Table 5.1 shows the standards of rigour applied in qualitative and quantitative studies and the issues addressed (Ary, Jacobs, & Razavieh, 2010).

5.3.8.1 Credibility

Credibility is equivalent to internal validity in quantitative studies (Bryman, 2015; E. G. Guba & Lincoln, 1994). It ‘concerns the truthfulness of the inquiry’s findings’ (Ary *et al.*, 2010, p. 498)

and ‘deals with the question of how research findings match reality’ (S. B. Merriam & Tisdell, 2015, p. 242). Applying more than one method of collecting data leads to an increase in credibility (S. B. Merriam & Tisdell, 2015). In the current research, two data collection methods were utilised. Respondents’ validation (member checks) is another strategy for achieving a high level of credibility (Ary *et al.*, 2010; S. B. Merriam & Tisdell, 2015). This technique is accomplished by sharing the interview questions and transcriptions with five interviewees to identify any inaccuracies and clear up any miscommunication.

5.3.8.2 Transferability

Transferability is equivalent to external validity in quantitative studies (Bryman, 2015; E. G. Guba & Lincoln, 1994). It is ‘the degree to which the findings of a qualitative study can be applied or generalized to other contexts or to other groups’ (Ary *et al.*, 2010, p. 501). Since qualitative research is conducted in small samples, providing sufficient detail is necessary (Ary *et al.*, 2010; Bryman, 2015). Ary *et al.* (2010) propose several criteria for enhancing transferability, such as similarity, descriptive adequacy, and limiting reactivity. The qualitative findings were compared with other published literature. This approach is achieved in the discussion chapter.

5.3.8.3 Dependability

Dependability is an equivalent for reliability in quantitative studies (Bryman, 2015; E. G. Guba & Lincoln, 1994). It is ‘the extent to which data and findings would be similar if the study were replicated’ (Ary *et al.*, 2010, p. 502). Nevertheless, in qualitative research, instability is anticipated because the settings of studies vary (Ary *et al.*, 2010). Shenton (2004) believes that increasing the dependability probability can be achieved by providing more details about the study. Accordingly, the researcher provided in-depth details of the study stages and analysis procedure.

5.3.8.4 Confirmability

Confirmability is equivalent to objectivity in quantitative studies (Bryman, 2015; E. G. Guba & Lincoln, 1994). It is ‘the extent to which the research is free of bias in the procedures and the interpretation of results’ (Ary *et al.*, 2010, p. 504). Ary *et al.* (2010) and Bryman (2015) demonstrate that accomplishing the completed objectivity appears impossible in qualitative studies. Nonetheless, strategies are recommended to minimise the researcher’s influence in the

research outcomes, such as applying more than one data collection method (Ary *et al.*, 2010; E. Guba & Lincoln, 1985; Shenton, 2004). In the current research, two data collection methods were utilised.

Table 5.1: Quantitative and qualitative data reliability and validity

N	Quantitative	Qualitative	Issues addressed
1	Internal validity	Credibility	Truth value
2	External validity	Transferability	Generalisation
3	Reliability	Dependability	Consistency
4	Objectivities	Confirmability	Neutrality

5.3.9 Reporting stage

5.3.9.1 Interview ethical considerations

Ethical issues in relation to this research were carefully considered and the investigator obeyed the standards advised by Durham University. Before commencing any empirical study, the following steps were undertaken by the researcher.

Before the written approval form, initial verbal permission to establish the study was obtained from policy makers at the University of Hail. This was an attempt to avoid any rejections that may occur in a further process, which might lead to impeding the smooth process of the undertaken study.

Subsequently, permission was requested from Durham University's Ethics Committee by submitting an application and providing them with the research proposal encompassing the complete details of the research methods as well as emphasising the investigator's awareness regarding the ethical issues to be crucially considered. The researcher's endeavour to fulfil the standards advised by Durham University resulted in the current study being approved by the Ethics Committee.

At the next stage, the researcher informed both the University of Hail and the Royal Embassy of Saudi Arabia Cultural Bureau about his intentions of carrying out empirical research at the University of Hail. The researcher also provided them with a copy of the research aims and purpose, including the research tools, to seek their permission and gain full access to university students and academic staff. As a result, the researcher was given permission and full access to

the university by both institutions.

An interview is a personal interaction that involves a moral dialogue. Thus, there are several ethical issues that need to be highly considered before or during the interview period. The issue of having informed consent is prominent. Furthermore, the interviewer has to ensure that the interviewees are aware of the investigation purpose as well as any potential risks or benefits that may emerge during or after the investigation. The rights of participants to withdraw at any time should be highlighted (Kvale, 1996). Before commencing the interviews, participants were assured of the voluntary nature of the investigation and their right to leave at any time. In addition, their permission was obtained to record the interviews.

Confidentiality is another ethical issue that must be addressed. Confidentiality entails that the information and privacy they disclose is kept safe and secure. In the current research, all the participants' identities will remain confidential and will not be revealed at any time. Any direct quote is treated anonymously. Finally, they are assured that their data are accessed only by the researcher and will be discarded after the study is complete.

A further concern relates to the verification of the interview transcripts. Cohen *et al.* (2013, p. 443) raise a question in relation to ethical issues when interviewing, asking 'How will the data and transcriptions be verified, and by whom?' Therefore, to ensure the researcher represented and reflected the interviewees' experiences and perception correctly and accurately, he sent the interview questions and transcriptions to five interviewees *via* their favourite tool of communication and asked them to read the interviewer's transcription. This procedure is more likely to increase the credibility of the interviews

Great efforts were made by the researcher to guarantee the smooth process of conducting and collecting data.

Bias is an important element of ethical issues relating to the investigator, which the researcher must be aware of. Unlike subjectivity, bias is highlighted by Richards (2009, p. 214) as 'a deliberate attempt either to hide what you have found in your study, or to highlight something disproportionately to its true existence.'

5.3.9.2 Result of semi-structured interview

The interviews were conducted with ten students to seek further required information. The interview questions were derived from the questionnaire.

5.3.9.3 Participant demographics

Table 5.2 shows demographic information related to the qualitative data and the 10 voluntary students involved in the research interview.

Table 5.2: Interview participants' demographics

N	Demographics	Number of students
1	Participants in the main questionnaire	10
2	Full time students	10
3	Used Twitter for academic purpose prior to this course	1
4	Male	10
5	Total	10

5.4 Challenges

The results of the questionnaire revealed that students agree that Twitter is a useful tool for enhancing the learning environment. The results also indicated that students experienced the challenge of using Twitter positively. To gain deeper information about this result and to report the students' experiences in more detail, the following questions were asked:

In your opinion:

- Was Twitter a useful tool in your learning environment, including social learning?
How? Why? Example?
- How does Twitter assist you in relation to your social learning? Example?
- What makes Twitter unique in social learning compared with other aspects, for example, Facebook, pen and paper? How? Example?
- What features does Twitter offer? How? Example?
- How does Twitter assist your learning with friends? Example?
- Does the use of Twitter make you want to use social learning more? If yes, how?
Example?
- How does Twitter assist your understanding of an educational topic? Example?
- Did you use the discussed information as a source for your exam? Example?
- Did Twitter work out the way you expected? Are you upset about anything? Did you find anything funny?
- How does Twitter connect you to your instructor? Example?

The interviewees' responses to the above questions are summarised below.

The majority of students admitted that using Twitter in a learning environment eases their communication with other students. They also highlighted their communication for academic purposes such as homework and required tasks. Moreover, there was almost full agreement among students that having an educational topic supported by social media expands and clarifies their understanding about the topic. One interviewee said that 'pictures are attractive; they combine more than one idea in one picture.'

As far as discussion is concerned, one participant responded by stating, 'yes, it is easy to respond and involve in the classroom discussion; Twitter is easier than pen and paper as we sometimes forget to bring them to the classroom.' In addition, students use Twitter to talk about and discuss class requirements and can return to the discussion at any time. Getting involved in Twitter discussion, either using particular Hashtags or simply replying to tweets, is an organised method

compared to another social networks, such as WhatsApp. Students commented that ‘Using Hashtag in Twitter is better than papers or WhatsApp in terms of organisation.’

Some students revealed that the ‘asking questions’ and ‘replying’ functions help them obtain information. For instance, ‘I find it easy to ask when I have questions for my friends.’ Another response was, ‘I had chance to look at my friends’ answer/reply in Twitter.’ In the same way, another student expressed a similar view, saying ‘I search for other students’ answers and read them; it increases our critical thinking by comparing it with my answer and, also, we can evaluate others’ responses.’

Most of the students like the widespread and various information on Twitter, which is shared by either students or the lecturer. Being able to access another student’s tweets or sharing information related to the subject matter assists other students.

One participant stated, ‘I check all the possible answers before responding to the required task. This can enrich my own answer, when I browse other students’ answers.’ Another participant said, ‘I find Twitter adds some information to what I already have.’ Regarding sharing the answers or information extended to another class’s students, one interviewee indicated that, ‘Twitter is for a wide range of people; it is better in sharing knowledge with others from different classes. Sometimes, I look and search for other classes’ tweets within the same subjects.’

Students also emphasised that applying Twitter in a learning environment helps them to understand better. ‘Twitter offers me an opportunity to correct my misunderstandings and expand my answers. Another view was that, ‘It helps me to improve my knowledge.’

In addition, most of the interviewees agreed that they were encouraged to cooperate and interact with each other: ‘Twitter encourages us to participate and interact with each other.’

Another student commented, ‘It increases our interaction with each other in the class, so I am able to interact with all students.’ Likewise, ‘We exchange our answers and correct each other, either face-to-face or on Twitter during class time.’

Another said: ‘Using Twitter changes the class environment to be more active. I prefer it, compared to the last semester during which we didn’t use Twitter in the classroom.’

In further response to the questions, students expressed the notion that they reminded each other *via* Twitter, saying it was useful for ‘Reminding and easily checking the requirements.’

To conclude this part, qualitative outcomes supported the questionnaires results by providing more details and providing examples on how particular activities/facilities were approached by students.

5.5 Obstacles

Results regarding obstacles derived from the questionnaire showed that the majority of participants disagreed with the given items, which further the obstacles of Twitter in relation to the learning environment. The researcher generated some questions to discover whether students may have encountered any obstacles not listed in the questionnaire's items. The generated questions are listed below:

In your opinion:

How did Twitter obstruct your studying? Example?

Was Twitter a useful tool in your learning environment, including social learning? How? Why? Example?

The interviewees' responses to the above questions are summarised below.

In general, nearly all participants did not specify any concern related to the use of Twitter in their learning. However, there were some very minor concerns that students reported during the interviews, such as internet connection. An additional concern related to privacy: 'I prefer not to use a public and open tool; I prefer a limited tool for class only.'

It can be argued that Twitter is a disruptive tool during lectures. However, according to interview data, the platform rarely appears to distract students' learning, as only one participant mentioned that 'in class, I sometimes check other tweets that are not related to the topic.'

To conclude, qualitative outcomes partially supported the questionnaire results by highlighting the barriers of internet connection and issues related to privacy and distraction. These are the only concerns that were raised by one or two participants during the interviews.

5.6 Positive capacity

The results of the questionnaires show that Twitter has a positive capacity in the learning environment. To gain in-depth information about this result and to report students' experiences in more detail, the following questions were asked:

In your opinion:

Was Twitter a useful tool in your learning environment, including social learning? How? Why? Example?

How does Twitter assist you in relation to your social learning? Example?

The interviewees' responses to the above questions are summarised below.

The majority of students acknowledged the helpfulness of Twitter in several areas. For instance, most of the interviews said that Twitter benefited them in relation to sharing educational resources: 'Yes, I am able to share all the related and various tweets with regards to educational topics, and I can ask for assistance if I need to.' An additional opinion was, 'Yes, I like the way we think together in the classroom, then we respond to the class Hashtag.' The positive use of Twitter was also found in utilising the platform to assist absent students. One student mentioned that 'it helps me when I don't go to the class.'

To summarise, interview outcomes supported the questionnaire results by expressing the capacity of Twitter in sharing and helping non-attending students. This is also supported by providing some examples of their use.

5.7 Personalisation

Quantitative results revealed that Twitter facilitates the personalisation of learning. It is also worth noting that the item 'Twitter allows me to personalise and express individuality and creativity' is the only item evaluated by students as 'strongly agree' in the entire questionnaire, according to the mean (M). To gain in-depth information about this result and to report students' experiences in more detail, the following questions were asked:

In your opinion:

Did the discussion on Twitter differ from discussion in class? How?

Was Twitter a useful tool in your learning environment, including social learning? How? Why? Example?

The interviewees' responses to the above questions are summarised below.

Nearly all the students agreed on the power of Twitter in expressing themselves (their points) and self-development. For instance, 'Twitter is better because I can take my time in responding and it reduces the level of shyness.' In addition, the use of Twitter has the potential to allow students to resend at their convenience, such as after reading more about the enquiries. An interviewee stated, 'I can answer at any time after more reading.' Another view was in self-interest and obtaining support from others: 'I use it more for developing my skills, such as asking people about English language vocabulary, especially when the vocabulary is not clear in Google translation.'

To summarise, interview outcomes support the quantitative results by expressing pedagogical potential in terms of further expressing their points. Twitter was approved as a tool to support individuals' interests, using examples to support the findings.

Chapter 6: Discussion

6.1 Introduction

This chapter discusses and reflects upon the findings of the current investigation. The research questions and hypotheses will be addressed, along with a discussion regarding the results derived from the questionnaires and interviews, and considered in light of the earlier literature review. Essentially, the organisation of this chapter follows the fourth chapter (see Analysis structures). The current chapter undertakes six dimensions. It commences by discussing challenges which students face during the integration of social media into the educational environment, then examines obstacles, the disadvantages of Twitter, positive capacity, engagement, and pedagogical potential in higher education. An outline of the chapter is presented as follows: firstly, the questionnaire results of all dimensions (factors) will be discussed, followed by interview results which provide a richer breadth of understanding. Thereafter, both findings will be considered along with existing literature. This will highlight the further extension, confirmation and/or contradiction of the current outcomes in relation to earlier research. Finally, summaries of each section compare the current results with earlier published findings; highlighting the research position in relation to other research.

In the current study, the questionnaire addressed each of the research objectives and questions. Meanwhile, the interview was employed in order to gain deeper information and obtain some examples related to the use of Twitter during the learning process. This research relies only on students' perspectives to gather empirical data. It should be noted that the participants in this study are undergraduates in Saudi Arabia who had experience using Twitter throughout their study during one full semester.

It is worth noting that the main title of the current research is, *'To what extent do University Students in Saudi Arabia find a Social Media Tool (Twitter) useful in their respective Learning Environments?'.* In order to investigate the topic, this thesis is divided into six dimensions according to the results gained from factor analysis during the analysis procedures. These dimensions (factors) are challenges (23 items), obstacles (10 items), disadvantages of Twitter (4 items), positive capacity (4 items), engagement (5 items), and pedagogical potential in higher education (3 items). Each dimension will be discussed individually.

In terms of questionnaires results, the questionnaire responses will be presented in three parts: *'agreement'* which is the combination of *'strongly agree'* and *'agree'*; *'disagreement'* which is also the combination of *'strongly disagree'* and *'disagree'*; and use of the *'mean'*. However, the fifth element of the Likert scale, which is *'neither agree nor disagree'*, was also added by the researcher because it was expected that not all participants had experienced Twitter's full features or functions. For example, there may be some participants who may not have contacted the

instructors on Twitter, therefore, forcing them to either agree or disagree may reduce the credibility of the research. As such, these sorts of groups are likely to choose '*neither agree nor disagree*'.

In addition, the present study's attempts to associate the current findings with related learning theories strengthens the research claims. The associations can be approached by two procedures; either applying them directly with the discussion of the results or adding them separately in a different section. This research attempts to link current findings with learning theories in a separate section to avoid repetition, as selected theories can be applied in multiple sections than a single part of the research.

6.2 Challenges

Learners face various challenges in the process of integrating technology into the learning environment. The aim of this section is to examine and discover the challenges that students experience when social media (Twitter) is integrated into their learning environment. The proposed research question is, *to what extent do students find challenges of integrating Twitter in a learning environment beneficial/detrimental and how?* This question is assessed and addressed based on the challenges, which consist of 23 items. These challenges are various, ranging from preparing before coming into the classroom, to completing the course at the end of the semester. This includes all features that technology may offer such as communication and interaction facilities. This dimension is significant as it provides a wider picture relating to social media usage in the learning environment. Thus, this section merely focuses on one dimension (challenges) of the topic under study.

In order to assess these challenges, students answered 23 items within the questionnaire after completing the session. This dimension appears to be the most significant as it includes the highest number of questions/items. Therefore, categorising these items into further classifications was required in order to discuss these items directly and more comprehensively. To illustrate, this dimension (challenges) is divided into the following categories: Place of activities (including preparing activities before the class, activities in the classroom and activities after the class); nature of tweets; dissemination visibility of tweets to others; learning; Twitter is more useful more than I thought; communication; interaction and collaboration; questions and answers; and understanding.

In the current dimension, all of the data is mainly derived from a five-point Likert scale (strongly agree, agree, neither agree nor disagree, disagree and strongly disagree), along with semi-structured interview results. However, there were some unexpected emerging themes from the qualitative data which will also be discussed.

It is valuable to emphasise that although these challenges are discussed individually, in the end, all of these will be gathered to reflect students' experience of Twitter in their learning environment. In this context, the first element is '*place of activities*' which encompassed three subsections. These will be discussed in depth below, followed by the individual discussion of other elements.

6.2.1 Place of activities

'Place of activities' is the first section in the present dimension. The unrestricted nature of the place of activities appears important, as users are able to complete required tasks in a flexible and

convenient way, rather than being limited to a specific place or time or simply relying on a learning management system such as Blackboard. Flexibility in place offers more possibilities in terms of accomplishing tasks faster and more easily. This section is divided into three subsections which are activities before, in, and after the classroom. The division is created surrounding the physical classroom. The aim of this section is to discover *to what extent students find Twitter a useful tool for educational activities in terms of before, during and after the classroom, and how it is useful for each of these*. The three aspects of the question will be discussed in depth individually.

6.2.1.1 Preparing with activities before the class

Preparing before coming to the class is an essential task that students need to practice in order to be ready for learning in the actual classroom. The preparation stage before coming to the classroom involves not only having prior knowledge related to the topic, but also means of connection between individuals, either among friends or between students and instructors. In this regard, Alhomod and Shafi (2013) report that activities in this phase are more likely to be maintained in and after class. It is assumed that *'Preparing activities before the class'* is a starting point for most of the activities that follow afterwards. In addition, prior communication among learners before attending the class leads to establishing face-to-face communication more easily. Therefore, it is beneficial to find out to what extent Twitter could help in this regard and how. The aim of this section is to understand to what extent students found Twitter helpful for tasks which they did before attending class and how. In response to this, data is obtained from Table 4.15 item 1: *'Twitter has helped me to prepare for the role I had to play in the face-to-face debate in class'*. Thus, based on the item results, students experience activities *via* Twitter prior to attending class positively ($M = 3.84$, agree), which leads to the conclusion that Twitter is perceived as a useful preparation tool before coming to the face-to-face-classroom setting.

In relation to qualitative data, there was an emerged data (result) which is called *'Task reminder'*. Task reminder was not planned in the questionnaire's statements; therefore, this is an unexpected finding. The emerged result will be added to this section because the possibility of reminding of the requirement is more likely to occur before an actual class or deadline; thus, within this context, it is linked to this part (preparing before coming to the class). Participants admitted that they reminded each other about the required task. An interviewee said that *'We remind each other about the tasks through Twitter'*, whilst another participant stated that *'Twitter has reminded us, and it is easy to check the requirement'*. These findings are important as they expand on how Twitter can be used before attending the classroom; however, this does not mean the activities *via* Twitter prior coming to the classroom are limited to this technique. This was linked as a possible example of students' usage.

In this investigation, this positive outcome is aligned with earlier research conducted by Alhomod and Shafi (2013) who found students used Twitter for preparation before actually coming to class. These authors insisted that this is important for establishing communications among students, and between individuals and the instructor. In other words, being ready for the classroom may not be limited to only reading required materials which students need to be aware of, but it may also aid individuals to find peers for continuing their preparation in the face-to-face setting. This is also beneficial for informing students about equipment which needs to be brought to the classroom such as a laptop or electronic devices. Within this context, the current study attempts to contribute to a wider body of knowledge regarding preparation activities *via* Twitter, before coming to the actual classroom. In Saudi Arabia, the research in this area conducted to date has been limited to Team-Based Learning (TBL) rather than integrating Twitter for all students (Alhomod & Shafi, 2013). This study aims to add to this by introducing Twitter to all students in the classroom rather than to selected groups for certain learning procedures. Different from Alhomod and Shafi (2013), the present research uses mixed-methods and focuses on students' perceptions of its value across a more representative sample of Saudi higher education students. Both studies suggest that Twitter is a valuable tool which can be used for preparing required activities before coming to the classroom. The current study also extends Tur and Marín's (2015) findings (namely that 88.9 % of their participants had positive responses to 'It has helped me a lot to prepare the role I had to play during the face-to-face debate') to a wider geographic area since the earlier research was conducted in Spain whereas the current study took a place in Saudi Arabia. In addition, the current finding appears to contribute to the literature that students use Twitter for tasks and requirements reminder. The current outcomes can be seen as a confirmation of an earlier survey which reported that students often use Twitter to prepare before coming to seminars (Pavlovic *et al.*, 2015). The interview results confirm Lin *et al.*'s (2013) finding that students enjoyed using Twitter as a tool for assignment reminders.

Undergraduate students in Saudi Arabia agreed that they can prepare for forthcoming classes through Twitter, which indicates that such social media platforms are a useful method to employ for this purpose. Being ready for the coming class can be seen as an educational goal, which is also emphasised by Rinaldo *et al.*'s (2011) finding that Twitter facilitated reaching educational goals. This may help the instructor to be more focused on learning outcomes rather than explaining what will be taught. Other practical or logistical purposes can also be achieved using Twitter as a form of communication. For example, sometimes it is necessary to change lecture rooms during a course, and social media can be used to notify students in advance. Students are more likely to check Twitter on their phones than other types of communication such as email or Blackboard; therefore, Twitter is much more efficient. Hence, incorporating Twitter in a learning setting has the potential to serve users in several facets.

There were a few disagreements in responses reported in this subsection; thus, it is likely that those participants may have erroneously applied Twitter or that the platform simply did not fulfil their expectations. Nevertheless, there was no data obtained in this regard during the interviews.

6.2.1.1.1 Theoretical perspective in terms of social presence

The results obtained from the above investigation indicated that initial communications among learners *via* Twitter are more likely to be established in preparing activities before coming to class. In the preparation stage, interpersonal communication occurs, which is the first element of social presence where students enter an academic environment and establish a sense of belonging to the group, leading them to engage in discussion. This concept of social presence is important for opening and creating an online environment (Garrison, 2011). Garrison (2011) acknowledged that knowing more about members of the online community results in an increased level of trust and responsiveness. In the current study, learners agreed that they found Twitter a helpful tool to prepare for classroom activities prior to attending class. They also used it to remind each other about course requirements. This indicated that in the preparing phase, learners initially create a connection with others. This connection is a key factor in facilitating individuals to know each other in a specific community in order to open and establish an academic environment. This created community may become stronger during face-to-face gathering and discussion. It can be concluded that Twitter is a practical tool for establishing interpersonal communication.

To summarise, introducing Twitter into the learning environment, along with encouraging students to utilise it for prior activities, is not only an effective tool for learners to be ready for the classroom but it also allows them to know each other in advance. This may be seen as time-saving during class as the learners and their peers are more likely ready to gather. Additionally, learners also used Twitter to remind each other about course requirements. The next subsection will investigate the usage of Twitter in the classroom.

6.2.1.2 Activities in the classroom

Having considered practical and preparatory activities before coming to the classroom, this section looks at students' perceptions of activities in the classroom through Twitter. Activities in the classroom are an important feature of higher education courses and the classroom environment needs to motivate students towards learning. This is an important dimension of learning because students are likely to learn better when they are motivated. This links to the concept that motivation is recognised as an essential factor in psychology and education (Anderman & Dawson, 2011). Social media is recognised as a possible tool for increasing students' motivation

(Poore, 2016). Moreover, adopting Twitter in the classroom environment has the potential to enrich students' participation (Elavsky *et al.*, 2011). Likewise, Tur and Marín (2015) emphasised that Twitter enhanced learners' motivation to contribute to classroom discussions. They explored the positive correlation between the number of tweets during lecture time and the development of classroom interaction as a way of researching this idea. They further identified another relationship between the number of tweets during the scheduled lectures and how Twitter assists students to learn course materials effectively (West *et al.*, 2015); hence, integrating Twitter is likely to motivate learners to complete classroom activities. During the session, activities can be conducted by different methods, procedures and tools depending on the educational goals. Thus, it is worth evaluating the convenience of such tools for discussion during lecture time *via* Twitter. In this regard, students were asked item 2 in Table 4.15 '*Using Twitter for classroom discussions is very convenient*'. Participants believe that they are engaging in discussions through a convenient tool ($M = 4.13$, agree), suggesting Twitter is a practical tool for classroom activities such as classroom discussion. The next is item 3 Table 4.15 '*Using Twitter has made me feel more comfortable engaging in discussions during class time*'. The positive result ($M = 3.96$, agree) for this item indicates that discussion *via* Twitter during class is perceived as convenient and students are comfortable using this platform for discussions. However, it can be argued that students are also able to be involved in classroom discussions through learning management systems such as Blackboard rather than using social media tools. Thus, students were also presented with item 4 in Table 4.15, '*Twitter is more effective in the classroom than Blackboard*'. Twitter was considered by the majority of students ($M = 3.99$, agree) as a more effective tool compared to Blackboard. This interesting result highlights the students' perceptions regarding the quality or utility of these tools for classroom discussion. Students were given item 5 in Table 4.15 '*Using Twitter improves the quality of the courses*'. A high agreement ($M = 4.08$, agree) indicated Twitter has the potential to improve the quality of the course. For item 6 in Table 4.15 '*I feel Twitter should be used more in courses*', the mean of student responses was 3.99 (agree). Overall, in this study, students had positive perceptions of Twitter as an appropriate tool for classroom activities when the platform is utilised correctly.

Within this research, the questionnaire outcomes (quantitative) are further expounded by the interview (qualitative) findings. Some interviewees emphasised the convenience of discussion *via* Twitter. For instance, one participant stated, '*yes, it is easy to respond and be involved in the classroom discussion. Twitter is easier than pen and paper as we sometimes forget to bring them to the classroom*'. Moreover, Twitter was used to interact, discuss classroom requirements, and highlight that they can return to the discussion at any point in time. Participants favour the way Twitter is organised and works compared to other social networks such as WhatsApp. They claimed hashtags or simply replying to tweets is more organised and commented that '*Using Hashtag in Twitter is better than paper or WhatsApp in terms of organisation*'. Managing

educational activities through Twitter, together with the way Twitter operates, was considered convenient and favoured by participants. Moreover, students in the questionnaire agreed to the higher effectiveness of Twitter in the classroom compared to Blackboard. Based on interview outcomes, students had a chance to talk (general) and discuss class requirements through Twitter. Having the capacity to conduct academic and non-academic discussions *via* Twitter may be the reason for its increased effectiveness compared to Blackboard where the conversation is more likely academically focused.

During the interviews, some participants identified the possibility of using Twitter during the revising period. One participant said, *'Twitter helps me in the exam. I used it as the source for revising'*. Consequently, it may be stated that introducing social media to the learning environment provides a place for students to return to in order to have more information or seek important materials during exam days.

Twitter is a media channel since tweets may include photos, videos, hyperlinks and texts. Interviewees expressed that Twitter is a place for supporting the topic. For instance, referring to participants' speech, *'it is easy to use pictures and videos to support the topic'*. This could explain the related item in the questionnaire which is *'Using Twitter improves the quality of the courses'*. A summary of the key points in lectures was also reported by participation in *'summary of lectures points'*.

To conclude, an interesting finding during one interview highlighted that supplementing Twitter into the lecture environment results in stimulating the classroom setting. To illustrate, that participant reported, *'I repeated the subject for the second time. Using Twitter changes the class environment to be more active. I prefer it, compared to the last semester which we did not use Twitter in the classroom'*. Thus, social media may be considered as a tool for changing lectures from traditional layout settings to more motivating and active environments.

The outcomes of the current study can be seen as a confirmation for the quasi-experiment lead by Rinaldo *et al.* (2011) who found that Twitter is a practical tool that fits into the classroom. It should be noted that the participants in the aforementioned study were limited to marketing students whereas the current findings confirm the benefit of Twitter in the classroom based on non-marketing learners (students in the School of Education). Moreover, students were only required to sign up and follow rather than requiring them to tweet. This may not reflect the full benefits of using Twitter as this strategy decreases the students' use of this platform unlike the current study wherein learners are highly encouraged to tweet and participate. This point is fundamental; as explained by Junco, Elavsky, and Heiberger (2013), an increase in student engagement and grades is observed when students are required to use Twitter for a course compared to when usage is optional.

The current study (in Saudi Arabia) geographically extends the outcomes of Elavsky *et al.* (2011) (in the USA) who found Twitter use in a large-lecture course is generally positive. Twitter, as a facilitating tool in large lectures, enhanced the learners' impressions, enthusiasm, and participation in the lecture. Current findings related to '*Twitter made me more comfortable engaging in discussion during class time*' also extends Elavsky and colleagues' (2011) findings that learners became more comfortable with Twitter and its format in terms of lecturer practice, enhancing course discussions in a new method beyond traditional limitations. In addition, the current study's finding that students reported feeling comfortable during Twitter discussions is consistent with Ferenstein's (2010b) report of a student's response regarding a Twitter-friendly class at Purdue University: "It's just an easy way to answer questions in class without embarrassing yourself and raising your hand in a big lecture hall." In the present research, students agreed that they felt comfortable engaging in classroom discussions *via* Twitter because the platform requires quick and short commenting and reflecting on particular tweets. This confirmed an older study which revealed that students felt microblogging tools are more beneficial than typical blogs in writing quick reflections and thoughts, while typical blogs might be more beneficial for storing knowledge (Ebner & Schiefner, 2008). The current findings further confirm the survey findings which indicated that the majority of students, both undergraduates (64%) and postgraduates (75%), viewed social media, including Twitter, as more convenient than traditional online tools such as Blackboard (Jacquemin *et al.*, 2014). Moreover, the outcome of the current interviews revealed that course topics were easily supported by media through Twitter (such as posting a picture or video related to courses) and had the potential to improve the quality of course. This confirms Jacquemin and colleagues' (2014) argument that Twitter augments classroom content. However, these researchers' study is limited to a single method questionnaire; thus, interview outcomes can be seen as explaining this augmentation in classroom content.

In addition, West *et al.* (2015) found that tweeting rates increased to double for lecture days as compared to non-lectures days. Previous positive outcomes could be explained with the interviewee response 'summary of lectures points'. For instance, the possibility of the growth in tweets may be the summary of topics concepts along with other classroom activities. Both are linked to the benefits of social media discovered by Blessing *et al.* (2012) who claimed that tweets in courses are important because they increase students' memory for key class concepts while they are out of the class. This is also essential given students have different learning abilities in a physical classroom due to the fact that some learners face issues with recall and learning, particularly those who suffer from learning difficulties (Vera *et al.*, 2005). In this regard, in the current study, some interviewees highlighted the necessity of Twitter in the exam period because they use it as a source of information during their revision time, which may also provide students (within learning difficulties) an extra chance to revise certain subjects. Hence, social media produce an environment where several objectives can be achieved for a wide range of learners.

This study found that Twitter can potentially change the traditional class layout, as reported by an interviewee who studied the course for a second time. This is fundamental as it is in accordance with Dr Parry's declaration which was cited by Ferenstein (2010b) 'it was the single thing that changed the classroom dynamics more than anything I've ever done teaching.'

On the other hand, the current findings contradicted a few studies, which will be discussed below. Markham and Belkasim (2011) examined Twitter for its use as an educational tool between two classrooms in Australia and the USA. They found that Twitter is not the ideal choice for social education (despite its use for creating and monitoring collaboration irrespective of physical distance) because the 140-character count limits its effectiveness. The contradiction can be seen in that unlike the present study, the research applied Twitter to cross boundary countries. Furthermore, there are some negative findings reported in relation to this technology as Twitter is seen as a difficult tool for use in the classroom. Although Twitter has a communication and pedagogy possibility, it needs careful planning as well as the support and motivation of educators (Osgerby & Rush, 2015). The study conducted by Osgerby and Rush (2015, p. 345), stated focus group results for engagement in the classroom as "Twitter is a bit too complicated for use in the classroom. It is being bent to do tasks which can be carried out using easier methods". Within the same study, it was reported that "Twitter in the classroom could be useful as you are able to get to know other students that you might not be able to talk to face to face". These results can be expected when studying cutting edge technology as some students may not like using social media at all. In the current investigation, it is worth mentioning that there were some students who completely rejected the use of and participation in Twitter during their study: *'we do not use technology at all.'* This may be taken along with the minority of students who answer by disagreement to provided items in the questionnaire. This minority may be encouraged or given an extra lesson on how to use Twitter appropriately for learning goals. According to Osgerby and Rush (2015), 46% of the participants disclosed that they would have been more motivated to utilise Twitter wherein grades has been particularly awarded for that.

It should be noted that the current research was not designed to assess or evaluate Twitter in terms of how formal discussion occurs. For instance, students' perceptions of social media in this regard was found obtuse to formal interaction (Jacquemin *et al.*, 2014). This is a fundamental notion to be considered before selecting an appropriate tool for a learning environment due to the fact that not all social media are seen as beneficial for integrating into the classroom environment.

The undergraduate students in Saudi Arabia in this study agreed that Twitter use during lectures is useful and effective. Hence, considering incorporating Twitter in the learning environment can be an effective method for changing the traditional lecture layout. The questionnaire and interview results of the current study are consistent with earlier research. Moreover, the current study

attempted to contribute to a wider body of knowledge regarding integrating Twitter into the classroom from a different context.

6.2.1.2.1 Theoretical perspective in terms of social presence

The outcomes gained from the above investigation indicated that open communications among students *via* Twitter are more likely to be established in classroom discussions. Open communication is directly affected by interpersonal communication which is initially created in activities before coming to class. According to Garrison (2011), ‘open communication requires a climate of trust and acceptance that allows questioning while protecting self-esteem and acceptance in the community’ (p. 39). The result of the current study indicates that users had an opportunity to be members of a trusted community wherein they can ask questions, receive answers, and be involved in discussions. Moreover, they found information relating to their course on Twitter to be reliable, either posted as new information or discussions around certain ideas. Interviewees declared that they used ideas and information shared on Twitter as a resource for exam revision. This could also be used to increase the climate of trust and acceptance; having such activities are signs of building a community. Hence, Twitter is a place for building open communities which is a key element in social presence.

To conclude, integrating Twitter with classroom activities appears an effective tool. Outcomes revealed that Twitter was found to be a more convenient and effective tool than Blackboard; moreover, students were also comfortable engaging in discussion. Additionally, experiencing Twitter in the learning environment leads to improving the quality of the courses, and learners liked incorporating Twitter in the courses. In terms of building community, forming and enhancing the established communities are possible. However, some negative aspects were reported. The coming subsection will explore the usage of Twitter beyond the classroom.

6.2.1.3 Activities beyond the classroom

Educational activities can be limited to the physical classroom building, but introducing social media allows the extension of activities to be carried out beyond class time. Twitter, for learning purposes, appears to be flexible and an incentive for students because it allows them to connect with each other in a way that is most meaningful to them (West *et al.*, 2015). The current research asked students to respond to item 7 in Table 4.15 ‘*Twitter improves interaction outside of class lectures*’. The results of this research (M = 3.90, agree) showed that Twitter can possibly extend educational activities beyond class. This may indicate the importance of Twitter in expanding and improving classroom discussions and interactions after class.

Exploring this in more detail, qualitative data discovered that learners could still check what has happened in session while they are away (not attended). One interviewee said that Twitter '*Helps me when I do not go to class*'. The importance of this is informing absent students about studied subjects so they can discuss any ideas related to the subject. This also increases the possibility of participating while they are away.

Both quantitative and qualitative findings further support the reported ideas of earlier research which revealed that Twitter's hashtag function is used to maintain and broaden discussions after class (Ferenstein, 2010a). The results also correlate with the findings of Grosseck and Holotescu (2008), namely that Twitter is a tool which can be used for extending face-to-face interaction which was initially created in the classroom. However, Grosseck and Holotescu's (2008) research evidence was supported based on 'Romanian Twitosphere' and a 'Romanian microblogging platform' rather than the Twitter tool itself, which may reflect the actual use of Twitter. Furthermore, the study seems an old one since the age of Twitter at that time was two years. The current study will build and expound findings regarding social media tools. Similarly, in Ebner and colleagues' (2010) research, microblogging is recognised as a novel form for extending collaboration beyond the classroom; however, although based on experimental design, the study only had a small number of participants. This current study, therefore, builds upon the previous findings, albeit with non-experimental outcomes, but confirms this aspect with both quantitative and qualitative data. Moreover, the current research, which highlights the effectiveness of Twitter in extending the educational activities beyond class time, also builds and expands on Ebner *et al.*'s (2010) conclusion that microblogging can possibly broaden teaching and learning beyond the classroom. The current findings provide similar outcomes based on a non-experimental design with a larger number of participants.

The undergraduate students in Saudi Arabia in this study agreed that using Twitter after lectures is useful and effective in improving their interaction. This also indicates that there are interactions which occur after the lecture ends and that adding such tools leads to developing this interaction. Using a different research background, the current study attempted to contribute to a wider body of knowledge in maintaining the usage of Twitter after class.

To conclude, based on the previous results related to three subsections (preparing activities before the class, activities in the classroom, and activities beyond the classroom), social media in an undergraduate learning environment is an effective tool that enables and links learning processes to smoothly run continuously after classroom time. In addition, lecture activities are the centre of the learning process that requires prior preparation in which Twitter is helpful. Meanwhile, it must be noted that students require expanding the lecture activities to beyond class so they can follow up what was taught in the class easier; but such connection needs monitoring, motivating, and great induction on how these tools can be used in the learning environment to increase benefits

and decrease confusion. Therefore, social media plays an important role in expanding and sustaining learning communities rather than being limited to certain areas or times. Having settled the discussion around the place of activities, the following section will move to investigate the dissemination of information *via* Twitter.

6.2.2 Dissemination

Sharing news, materials, and knowledge are seen as key elements related to the utilisation of social media. This has the potential to enhance students' awareness by staying connected with others, gaining new and extra materials, or simply producing new information and responding to a requirement. These advantages contribute to strengthening the connection amongst members of the communities which result in knowing more about each other. This plays an important role in increasing the level of trust and responsiveness in a community (Garrison, 2011). Consequently, this study was designed to ask participants item 8 in Table 4.15 *'I believe Twitter benefits my social learning network'*. In this regard, the social learning network includes classmates, instructors, shared information, and discussed ideas. Participants believed ($M = 4.04$, agree) in the benefits of Twitter in their social learning network. Next is item 9 in Table 4.15 *'Twitter promotes knowledge sharing'*. In this regard, knowledge includes course-related topics and ideas, extra reading materials and news related to the classroom. Students reported a positive result ($M = 4.10$, agree) related to the promotion of knowledge sharing *via* Twitter. Based on these results, Twitter is a tool that enhances knowledge sharing for students and benefits their social learning network. The quantitative results will be explained further through qualitative data.

Interviews demonstrated that sharing knowledge and various information are widely pointed out by participants. Qualitative findings extend the quantitative results by adding that shared ideas or responses are essential in developing knowledge, as students are able to be critical about their own idea/knowledge and learn from posted tweets. Being able to access others' tweets and their distribution of information with regard to the educational topic is viewed as useful by students. For example, *'I check all the possible answers before responding to the required task. This can enrich my own answer when I browse other students' answers'*. Another believed that sharing information and spreading social learning networks helped learners to extend their knowledge by saying that *'Twitter adds some information to what I already have'*. Moreover, an interesting result was discovered during the interviews, namely that social media has the potential to open up one class to another leading to increasing the communities' members and information. This is a great benefit, particularly when more than one class is studying the same subject in the same semester. An interview respondent stated that *'Twitter is for a wide range of people; it is better for sharing knowledge with others from different classes. Sometimes, I look and search for other classes' tweets within the same subjects'*. It seems that there is a potential to look at other students'

tweets from different classes or even contact them for academic and non-academic proposes. Therefore, social media in the learning environment is not only limited to classroom members; it also offers possibilities to open up one class to another. In this case, the social learning network is likely to expand to more members. These opportunities in sharing and disseminating news or information about the course materials have remarkable data storage advantages. This was pointed out by an interviewee who stated that *'In Twitter, I can find everything I want in regard to my study; I do not need to contact my friends to ask them about the required tasks'*. Accessing available tweets is a great advantage for learners in terms of seeking information rather than seeking help from peers.

Outcomes confirmed Oye and colleagues' (2012) findings that Twitter is a tool employed by students for various academic activities such as sharing news and exchanging multimedia recourses, assignments, and resources related to their subject. Their study took place in Malaysia; thus, similar results appeared to increase the possibility of generalising the findings. The current findings build upon and extend the work conducted by Alim (2017) who identified that sharing resources and posting important information is one of the top teaching activities used *via* Twitter in Saudi Arabia. It should be noted that even though Alim's (2017) study sample rate was low (around 60 academic staff members), the study along with the current investigation complement each other due to the fact that the target sample of Alim's study was academic staff while the target sample of the current study was students. Together, the cited study (based upon academic thoughts) along with the current study (based upon students' perceptions) provides a confident result that Twitter is an effective tool for sharing information in Saudi Arabia. The current study showed that the undergraduate students in Saudi Arabia found Twitter a valuable tool that increases their social learning network and helps to share wide and varied information such as materials, classroom news, and related sources. This contributes to the knowledge in this field and is broadly consistent with Alim's (2017) earlier published research. It would be interesting to conduct research and match findings from students and academics in the same study.

Furthermore, the current findings are consistent with Fox and Varadarajan's (2011) study which found that 81% of students insisted on the importance of Twitter in relation to sharing ideas amongst themselves and expressing their thoughts to the class that otherwise cannot be done. This study also highlighted the value of reading other students' tweets. In accordance with the current study, several interviewees shared similar thoughts such as *'I check all the possible answers before responding to the required task. This can enrich my own answer when I browse other students' answers'*. Similarly, the current participants weighted the value of Twitter in enriching their own answer by exploring other tweets; this also can be built upon an earlier study conducted by Tur *et al.* (2017).

The qualitative outcomes further indicated that social media has the potential to open up one lecture to another in relation to sharing. This is seen as an extension of the recent study findings where Twitter was examined as a learning tool and was found to have enabled 93% of students to share their views with others from outside their class (Becker & Bishop, 2016). Further evidence from students reported by the study is that “I talk over Twitter with other students about their projects and ask for help if I need help” (Becker & Bishop, 2016, p. 13). To illustrate the contribution to the study, the sample target of the cited research was a middle-grade classroom, while the current finding was obtained from higher educational participants. Thus, this can be seen as expanding the result from middle-grade classrooms to a higher level.

On the other hand, Huseyin Bicen and Cavus (2012) investigated the most preferred used habits of students on Twitter and found that quotes and photos were the top behaviours on Twitter, whereas sharing educational materials were less common. However, it was found that the investigation was carried out to report students’ preferable habits generally on Twitter without any encouragement to incorporate Twitter for educational practice. Thus, it can be argued that it is unclear whether students use Twitter for sharing educational related information, but that does not mean it is not suitable for education or adversely impacts their learning.

To conclude, having social media in the learning environment can potentially help learners to share related concepts and developing their knowledge. Consequently, these technologies may open up one class to another, leading to an increase in the communities’ members and information. Having provided the discussion around dissemination, the following section will present the discussion related to communication *via* Twitter.

6.2.3 Communication

Communication is a fundamental factor in social media which students are more likely to practice when utilising these tools. According to Poore (2016), integrating social media in educational disciplines contributes to a wide range of opportunities, one of which is communication. In the learning environment, this possibility is needed because learners are able to reach others for educational purposes and seek advice, confirmation or more information. The current research attempted to address and determine to what extent students practice communication *via* Twitter for educational purposes. The participants agreed ($M = 3.88$, agree) with item 10 in Table 4.15 *‘I feel more connected with classmates by using Twitter’*, therefore, the possibility of this platform serving them to connect with their peers is established. The following item 11 in Table 4.15 *‘I am able to contact my instructor more often by using Twitter as compared to when I did not use*

Twitter' suggested students found Twitter a valuable tool for connecting them to their instructors (M = 3.63, agree). The quantitative results revealed that students can use this platform to practice connecting with other learners or with their instructors along with establishing a communication environment. The connection among learners and between learners and their instructor is significant in fulfilling students' needs.

During the interview phase, nearly all the participants emphasised the potential of Twitter for educational communication. Moreover, they highlighted the ease of communication through Twitter subsequently helped them get to know one another more during class. This easy communication frequently reported by interviewees suggests that students tend to utilise tools that are easy to use. For instance, several interviewees stated that Twitter makes it '*Easy to contact with friends*'. The questionnaire results showed that students are more connected with each other and with their instructors. Based on qualitative results, the increase in this connection may be due to the ease with which social media helps to establish connections. The interviews' results provided an example of how students and their lecturer established communication. For instance, one student responded to an imposed question with 'Yes, I contacted my lecturer with regard to having an excuse for not attending class. I get a quick response'; however, this does not mean that their communication is limited to this purpose.

The present study further explored the evidence provided by Bledsoe *et al.* (2014) who applied a grounded theory approach and discovered that participants highlighted the benefit of Twitter in communication with their classroom group members in real time. The previous study was limited to 62 graduate students in the USA. Thus, the current study attempts to expand this finding to undergraduate students along with applying a mixed-methods approach. Furthermore, the current results validate earlier research findings that students were able to communicate more with friends, indicating close and fast responses. List and Bryant (2008) showed that students effectively communicate *via* Twitter in relation to homework; fundamentally, students' inquiries were answered by their friends before the teacher even had a chance to look at it. In addition, a descriptive study revealed that social networks, including Twitter, provide an opportunity for students to communicate with peers who find it difficult to meet up with classmates and that they were able to communicate their thoughts and perceptions regarding different topics with a greater number of learners (Roy & Chakraborty, 2015). The preceding research was restricted to 50 undergraduate students in India and only applied a questionnaire for collecting primary data. Hence, the current investigation builds upon that from different sample perspectives, namely by applying a mixed-methods approach. Additionally, the current findings further explore earlier research conducted in the field by Ebner *et al.* (2010) who state that Twitter is intrinsically an important platform that leads users to practice effective communication with classmates and exchange contents among individuals by addressing that microblogging is a novel method which can be used for informal learning through informal communication. Therefore, considering the

result of the current study together with earlier research conveys that social media platforms are environments that students use for communication among themselves for educational purposes. This connection for educational purposes *via* Twitter indicated that the learning process occurred as a result of this connection. This can be linked to support the earlier studies by Junco *et al.* (2011) who discovered that learners and faculty were both highly engaged in the learning process through communication and connection on Twitter. In addition, the current outcomes can be applied to confirm earlier findings, namely that Twitter is used to chat with classmates and supervisors in relation to their educational topics (Oye *et al.*, 2012).

To conclude, Twitter is a place wherein individuals obtain support and fulfil enquiries as a result of communicating with peers and their instructors. It is possible to demonstrate that utilising easy to use tools leads to more communication among learners themselves or between learners and instructors or other users. This ease of use helps to increase communication among students and between students and their instructors, which indicates that learning is more likely to take place through communication *via* Twitter. The current study further contributed to the wider body of knowledge in this area by also showing that the undergraduate students in Saudi Arabia found Twitter a helpful and practical tool for communication. Consequently, social learning is more likely to occur amongst learners by communicating and connecting *via* social media correctly.

6.2.4 Interaction and collaboration

Interaction and collaboration are fundamental factors in the learning process. Interaction for educational aims is often the instructor's goal. According to Poore (2016), integrating social media in educational disciplines contributes to a wide range of opportunities, such as interaction and collaboration. Considering that social media was found to be an effective method to enhance online interaction (McNeill *et al.*, 2016). The current study attempted to figure out to what extent students practice social media for educational interactions and collaboration. Participants were asked three items related to interactions. Firstly, item 12 in Table 4.15 *'Twitter improves classroom interaction during lectures'*. Interaction was improved *via* Twitter usage during lecture times (M = 3.99, agree). The next item 13 in Table 4.15 *'Twitter improves interaction outside of class lectures'*. Interaction was improved *via* Twitter usage after lecture time (M= 3.90, agree). The following item 14 in Table 4.15 *'Twitter has helped me to participate more in debates'*. Participants agree to the helpfulness of Twitter when participating in debates (M = 3.94, agree). Thus, students found social media an environment for interaction both in and out of the classroom along with their participation being boosted. In addition to investigating interaction, collaboration on Twitter was also examined with item 15 in Table 4.15 *'Twitter provides collaborative learning*

opportunities'. The findings indicated that respondents agreed with the possibility of Twitter serving collaborative learning ($M = 4.10$, agree). This study showed positive student perceptions which revealed that social media platforms are tools that students use for interacting with learners or their instructors and establishing a collaborative environment. The numerical data will be explored in more detail through qualitative findings.

Interview results attempted to expand on the quantitative results by providing more details. According to the quantitative results, Twitter improved interaction both in and out of the classroom. During the interview stage, interaction in the classroom was highlighted by participants. For example, an interviewee said, '*we exchange our answers and correct each other, either face to face or on Twitter during class time*'. Another stated that '*Twitter is open for all students, not only from the class. Twitter is better than traditional classes as it changes the classroom routines. Twitter allows for a fewer word count than WhatsApp, so it is direct to the point*'. A further concordance among interviewees is that '*Twitter increases our interaction with each other in the class, such as I am able to interact with all students*'. The current finding expounded and confirmed what was found in the questionnaire results, revealing that interaction may occur in both ways – face-to-face and on Twitter. This may extend the ongoing interaction from a face-to-face setting to online *via* Twitter or vice versa, which is either initially established in or beyond the classroom. Moreover, based on students' reports, learners have more chance to interact with all students rather than being limited to particular ones. This may help us to demonstrate that integrating Twitter provides opportunities for all learners to interact with a wider number of classmates which is important in having a larger range of knowledge and building communication.

Regarding out of classroom interaction related to educational purposes, interviewees expanded on and confirmed the questionnaire's outcomes. To illustrate this, one interviewee acknowledged, '*I got benefit from other students in different courses*' and another reported, '*It helps us in short classes, extending some discussions after class time*'. To conclude, social media might not only extend the ongoing interaction but also allows the interaction to occur among a wide number of users from different classes rather than being limited to a particular group. Indeed, social media facilitates and extends the range of interaction beyond a limited environment such as a classroom. However, this was only reported by one interviewee who may already have an existing relationship with others in different classes, or their interaction fundamentally occurs because of the competence of social media in the learning setting.

Quantitative data also showed that integrating Twitter has the potential to help motivate learners. This was further discussed by an interviewee: '*Twitter encouraged us to participate and have interact with each other.*' Therefore, it can be agreed that Twitter may be seen by learners as an encouraging tool that enhances the level of interaction.

The current results correspond with earlier research conducted by List and Bryant (2008), namely that Twitter is a successful tool for academic and social interaction and peer tutoring, evidenced by examining the quality and frequency of learners' interaction with this particular tool. It should be noted that prior research was conducted when Twitter was in its infancy and not as popular as it is now (during the undertaking of the current study). Also, the sample target was early college and high school students with low participants. Moreover, in List and Bryant's (2008) examination, there were three technological tools which were applied simultaneously rather than focusing on Twitter alone. This may produce overlaps in the technologies' affordance and capabilities. In addition, the current study found Twitter helpful for students to interact more with each other. For instance, participants replied to a related question with '*Twitter increases our interaction with each other in the class, such as I am able to interact with all students*'. This is a significant finding as it indicated that interactions among learners are not only limited to their peers but that they also interact with all students in the class. Having a wide range of interaction is beneficial for enhancing classroom interaction. This can be used to validate West *et al.* (2015) who discovered a positive relationship between Twitter-enhanced classroom interaction and the number of tweets posted during lecture times. Furthermore, within the same study, there is a consistent finding that the present outcomes showed learners maintained ongoing interactions beyond the classroom. One interviewee stated that '*It helps us in short classes, extending some discussions after class time*'. This also associated with West and colleagues' (2015) outcomes in that students felt integrating Twitter into their lectures enhanced interaction among learners and between learners and professional members both in and outside of the actual class. The study relied only on online questionnaires while the current findings were obtained from both an online questionnaire and interview. Further consistency can be seen in relation to the range of interaction as it extends to more than class members. One study examined Twitter as a learning tool and the results revealed that 93% of students agreed or strongly agreed to the ability of Twitter in allowing them to interact with others who are not a member of their class for learning purposes (Becker & Bishop, 2016). This was also confirmed by the current study based on interview outcomes: '*I got benefit from other students in different courses*'. This work emphasised the effectiveness of Twitter in not only improving interaction among learners and between learners and their instructor in the classroom but also beyond the classroom and with other members. This highlighted the capacity of Twitter to allow students more time to stay in touch for learning purposes. This leads us to consider findings produced by Fox and Varadarajan (2011) and Prestridge (2013), specifically that increasing interaction on Twitter required motivation by the lecturer, which could play an important role in maximising the successfulness of Twitter integration. Further investigations will present the effectiveness of Twitter in asking questions and receiving answers.

6.2.5 Questions and answers

Posting questions and receiving answers are the key elements in education practice. Students raise their concerns (ask) and these are addressed (answered). Providing such opportunities potentially addresses learners' needs, therefore integrating social media can be seen as useful in this regard. It was revealed that one of the top teaching activities used *via* Twitter enabled students in Saudi Arabia to ask questions (Alim, 2017). Therefore, the current study attempted to address two items: item 16 in Table 4.15 *'The questions and answers on Twitter were very helpful'* and item 17 in Table 4.15 *'I enjoy using Twitter in the classroom for asking questions during lecture'*. Regarding item 16, according to students' responses, this practice was helpful ($M = 4.12$, agree). Regarding item 17, in addition to the helpfulness of questions and answers, students enjoyed practising this activity in the sessions ($M = 4.08$, agree). The results of both items showed that questioning and answering *via* Twitter was helpful and enjoyable. The possible explanation for this result is that learners found answers to their questions in Twitter so they demonstrated that it was helpful, in addition to enjoying using Twitter in a learning environment. This outcome will be explained in more detail *via* interviews.

In terms of qualitative data, several students acknowledged that questioning and replying functions are helpful. For example, an interviewee said, *'I find it easy to ask when I have questions for my friends'*. Moreover, another said, *'Twitter helps us in answering our friends' questions'*. Therefore, along with the questionnaire's findings, Twitter appears to be a platform to pose questions as well as respond to friends' questions. This can be seen as a supportive result in quantitative outcomes. Another participant acknowledged, *'I can access at any time. I am able to ask about the task even when I am absent'*. This is a great sign that students are addressing their enquiries through social media by asking their peers.

The evidence from this study showed that there is concordance with Gonzalez and Gadbury-Amyot (2016) who reported students' perceptions about the use of Twitter in their study. They stated that asking questions and receiving answers *via* Twitter was helpful throughout their work and that it also increased their accessibility to the instructor through posting an enquiry and receiving a response. Nevertheless, the study relied on only 40 responses (questionnaires) from the School of Dentistry, which seems too low in rate, therefore, the current research expands and confirms the finding based on a different geographic area and research approach. Having the questioning and answering (Q&A) as a helpful method in relation to a learning community can confirm a work which reported that Twitter is an excellent tool for responding to students' questions concerning assignment deadlines (Neal, 2012). Primarily, the current findings emphasised Twitter's usefulness due to the fact that learners found the platform helpful in responding to each other regarding educational inquiries.

The interview's findings revealed that asking questions on Twitter is an easy task to accomplish. These findings are linked with West *et al.* (2015) who reported that students appreciated the value of Twitter in allowing them to establish a connection with their professor (as they can easily ask a question *via* this platform). Likewise, the current positive outcomes confirm work produced by Pate (2015) who identified questions and answers as one of the three main types of tweets created by students during lectures and tutorials.

On the other hand, the present findings appear contradictory with Knight and Kaye's (2014) findings that "students made greater use of Twitter for the passive reception of information rather than participation in learning activities" (p. 1). They found the most common student activities (13.9% of the total 137 participants) involved posing questions to specific users other than the students' tutors, followed by posting general questions about assessment or class content to all followers. In contrast to Knight and Kaye (2014), the possible explanation is that the current study was designed for investigating Twitter integration into a learning environment and using Twitter for educational practice within classroom communities rather than involving others for such actions such as Knight and Kaye (2014) whose investigation examined Twitter use for academic purposes (in general) without assessing the integration of Twitter into the actual learning environment. It can be argued that students in Knight and Kaye's (2014) research sample may have used other social media tools more than Twitter for academic purposes.

This section has investigated the questioning and answering *via* Twitter. Learners declared that these activities are helpful, enjoyable and easy to conduct. In this regard, the result of the current study highlights that learners did not only tweet a number of questions, but they enjoyed using Twitter during lectures for this purpose. Effective questioning and answering can clarify understanding, which will be discussed in the next section.

6.2.6 Understanding

Understanding is the core aspect of the learning process and can be evaluated through various methods. In the current study, evaluation of understanding is based on students' perception rather than providing tests. Regarding item 18 in Table 4.15 '*Twitter helped me to achieve a deeper understanding of the topic in debate*', students' understanding of the topic was enhanced by the use of Twitter ($M = 3.99$, agree). Next, regarding item 19 in Table 4.15 '*Twitter has helped me to understand the argument of other participants in the debate*', learners agreed Twitter assisted in understanding and following the argument of others ($M = 3.94$, agree). This result suggests that Twitter is seen as an effective place for increasing students' understanding in relation to the educational topic. In addition to quantitative results, qualitative results shall be discussed below in this regard.

Understanding educational topics *via* Twitter was also emphasised by interviewees. Social media was found as a useful means for supporting students' understanding. Learners stated that integrating Twitter in the learning environment results in a deeper understanding and exploration of educational topics. For instance, one participant responded, *'pictures are attractive; they combine more than one idea in one picture'*. A closer look at this statement indicated that the increase in understanding may be due to rich media (including both informal or formal photos, videos and diagrams) in a single tweet. Moreover, learners viewed Twitter as a place for clarifying and correcting their understanding. Those who responded felt that *'Twitter offers me an opportunity to correct my misunderstanding and expand my answer'*. This explanation contributes to how Twitter may help in understanding educational topics.

This study is consistent with earlier research conducted by Yang *et al.* (2014) and Tur and Marín (2015) who found Twitter helped learners gain a deeper understanding of educational topics. The current research found rich media (including both informal or formal photos and videos) in single tweets assists learners to understand the topic. This confirms earlier research conducted Yang *et al.* (2014) who stated that informal explanation through social network sites produced direct opportunities for students to enrich their experience about learning a subject. The former study focused on supporting afterschool groups' learning of Mandarin; moreover, in this part of research (achieve deep and meaningful learning), the method applied is sequential observation. Therefore, the current research appears as a confirmation in terms of the mixed-methods approach and different research focus (not Mandarin). In addition, the current findings extend and confirm a further study conducted by Tur and Marín (2015) which found that 80% of participants think that Twitter activity helped them to better understand the topics in a debate. Thus, the cited study explored Twitter for learning from qualitative (content analysis) and quantitative (questionnaire) of students' perceptions in Spain, while the current research applied the mixed methods approach (questionnaire and interview) along with different background research samples.

In contrast, Zainal and Deni (2015) revealed a negative result related to the development of students' learning (in the literature of research methodology class) *via* Twitter. According to the author, this may be caused by the nature of the course, student preferences, and inadequate infrastructure along with positive feelings when using this platform. The former study differs to the current in that it is limited to 29 students in Malaysia; moreover, in this research, 19 out of 29 participants preferred using Facebook as they are more familiar with this platform than Twitter.

This section has given an account of the questionnaire's outcomes. It revealed that students found the integration of Twitter for educational topics leads to a deeper understanding, which was confirmed and explained by the subsequent interviews. Based on interview reports, this deeper understanding may be due to learners having a longer time (a combination of before/during/beyond class) than their scheduled sessions to discuss educational topics.

Moreover, the richness of tweets themselves, such as having images or video, has aided learners to understand educational topics more deeply.

The next section will discuss the ideas contained within the theme ‘Twitter is more useful than I thought’.

6.2.7 Twitter is more useful than I thought

Believing in Twitter as a learning medium can be different among individuals. This belief is likely to change as a result of individual experiences. Therefore, it is vital to see how students’ thoughts are altered after experiencing Twitter for learning. Change in individuals’ thoughts, before and after using Twitter, is a possible indication that students found this tool useful (thus, they have learnt *via* Twitter). In this regard, learning means a change in belief, knowledge or attitude (Ambrose *et al.*, 2010). Hence, the changes in individuals’ perspectives and understanding related to Twitter are viewed as a result of learning.

The current research evaluated student responses to item 20 in Table 4.15 ‘*Twitter is much more useful for the course than I thought it would be*’. Students found Twitter was a useful tool for their course ($M = 4.00$, agree), more than they thought it would be. This result showed the change in students’ thoughts before and after using Twitter for learning. This result will be expanded further based on qualitative outputs.

During the interview phase, it was demonstrated that students did not like the concept of integrating Twitter into learning at the beginning of the study. However, students stated that they later discovered it was useful. According to one participant, ‘*at the beginning, I thought it could be difficult to use Twitter for learning purposes, but I later discovered it is not*’. The current result determined that at the beginning, several students did not see Twitter as a place for academic work and student learning. Some participants thought that learning would be impossible through social media as it may be complicated to integrate Twitter in the learning process. Besides learning *via* Twitter through tweets, the process of integration appears essential to student learning which may increase or decrease the benefit of these instruments among learners.

The changes in students’ feelings was stated by Osgerby and Rush (2015, p. 345) who reported focus group responses in relation to the use of Twitter as a learning support tool: “Since I didn’t use Twitter before I was hardly interested in using it, but as I got along I did find it quite helpful”. Even though the authors of the study did not emphasise the change in students’ feeling, this outcome is related to the current finding, as both indicated that the learner’s feelings alter after using Twitter for learning. Both results showed that learners may have negative feelings about adopting Twitter for learning before actually using this platform, which may prevent them from

using social media for learning purposes. Interestingly, qualitative research showed a theme related to academic practice and Twitter activities among graduate students, for instance, a change in student perspectives from uneasy experience to entirely fun to practical and very helpful (Bista, 2015). This associated with undergraduate students in the current study as they also expected Twitter would not be easy to adopt in an academic discipline. Based on both studies, it can be said that graduate and undergraduate students shared the same thoughts at the initial stage.

Interestingly, looking at this from the instructors' perspectives, the initial thought related to Twitter in educational disciplines is not always positive. This was reported by Parry (2008) who found that at the commencement of his research, several instructors were hesitant to use Twitter for daily teaching. Conversely, afterwards, they appreciated the effectiveness of Twitter as a classroom tool due to the fact that it alters the traditional classroom concepts. This is associated with the current findings in that some users would evaluate Twitter as an unsuitable tool for learning. However, this feeling would alter once they used this tool in the learning environment.

To summarise, it may be predicted that not all learners appreciate social media as a learning tool. This is perhaps due to the fact that some would view social media as platforms designed for social and entertainment purposes only rather than considering them as a tool that supports learning.

6.2.8 Learning

Even though the prior presented results contribute to improve student learning, it seems valuable to report students' perspectives in this regard. Following the previous sections, learning is the target of all individuals and can occur using various methods. One of these methods is learning *via* social media. Therefore, it is significant to find out whether any learning transpired, based on students' perceptions. Junco and Cole-Avent (2008) and West *et al.* (2015) advocated that social media in education enhances student learning. Schroeder *et al.* (2010) reported that Twitter contributes to more informal communication, which results in improving the quality of the program. Indeed, informal communication between learners and instructors is a significant factor in the overall learning experience (Mottet *et al.*, 2004, cited in Schroeder *et al.*, 2010). In this section, learning evaluation relies on individuals' perspectives as to what extent they learnt *via* social media (Twitter). In order to address this inquiry, participants were asked to rate their agreement based on the following statements: item 21 in Table 4.15 '*I acquired personal or professional growth after completing the course*' (M = 3.62, agree); item 22 in Table 4.15 '*Twitter helped me to learn course materials more effectively*' (M = 3.83, agree); item 23 in Table 4.15, which attempted to find out the ease of learning *via* Twitter – '*Using Twitter makes learning easier*' (M = 4.06, agree). The available evidence suggests that students found social media a place for effective and easy learning as well as for personal and professional growth. This result

can be explained further. For example, based on prior discussion, exchanging ideas and opinions among each other, involvement in discussions, asking questions, receiving responses, interaction and collaboration increase student learning. Besides that, extra materials posted and rich media in a single tweet increase the possibility of learning occurring. This result confirms and extends the research by Junco *et al.* (2011) who found that Twitter has a positive impact on the learning environment as it increases student engagement and improves grades. Moreover, they found the analysis of tweets activity reveals that a Twitter stream created a strong learning community among learners. Furthermore, the current findings support Ebner and colleagues' (2010) results, namely that Twitter is an entirely new form of communication which supports informal learning beyond session time. This study was, however, based on an experimental design with 34 students only. The present study attempts to expand on these outcomes using a non-experimental design and having a higher sample population from different backgrounds. Therefore, in general, previous findings along with the current results highlight Schroeder and colleagues' (2010) observation that integrating social software contributes to obtaining knowledge regarding the subject matter and improving students' skills in relation to the use of particular social applications.

In contrast, Twitter does not always show a positive contribution to learning such as research conducted by Zainal and Deni (2015), as this may also rely on the material itself (Twitter did not extend students' learning about a course's topic). This was discussed earlier in section 6.2.6 (Understanding).

The next subsection (visibility of tweets to others) is linked to learning with respect to the social constructivism theory.

6.2.8.1 Visibility of tweets to others

This category differs from other categories in that visibility of tweets to others has been discovered during the interview stage and it is an unexpected result, emerging during conducting the current research. It should be highlighted that this part of the research will be only addressed by interview data. Individuals can learn from others *via* different methods, such as asking them directly or simply by having opportunities to look at their tweets. Social media platforms are open to the public, which means that everyone is able to see other posts (ideas and information) unless these are protected. Through applying social media in education, students can see other posts/tweets such as comments, discussion threads or simply their responses to a specific topic or question. This visibility is seen as a positive feature by most of the students who reported it in the interview phase. For example, a participant stated, '*we benefit from our question/answers as I had a chance to look at my friend's reply in Twitter*'. This indicated that the availability of tweets to others is considered as an advantageous feature in social media. Another interviewee responded

that *'I search for other students' answers and read them; it increases my critical thinking by comparing it with my own answer and I can evaluate others' responses'*. Thus, it can be said that students could learn *via* this procedure when paraphrasing another's work. Moreover, the visibility of tweets has helped learners to be more critical about their own answers due to the fact that they were able to evaluate their replies themselves before tweeting. Paraphrasing is identified as a learning strategy under the elaboration learning strategies type (Weinstein & Mayer, 1983). According to Weinstein, Acee, and Jung (2011), paraphrasing and summarising require some level of processing and understanding, as rewriting information or ideas in other words and writing style entails cognitive processing.

The next interesting result is that some interviewees did not only evaluate themselves, but they also evaluated and provided feedback to each other: *'I can evaluate others' responses.'* These results are consistent with previous research conducted by Osgerby and Rush (2015, p. 346) who quoted students' responses in focus groups such as, "using Twitter is helpful because I can see other students' opinions and the way they solved the question" and "Twitter was useful to compare my answer with the other answers posted by students". Providing similar results in the current investigation implies that this study confirms the finding of Osgerby and Rush (2015). The current findings showed that the visibility of tweets increases the self-assessment for gauging the correct answers – one interviewee said that *'it increases my critical thinking'*. This is a remarkable result which is also consistent with participant responses in Osgerby and Rush's (2015, p. 346) study: "If the majority of people say the same thing I assume the information is accurate." Thus, both current and previous qualitative results emphasise the benefit of visibility of tweets for other students in terms of learning and acknowledging other tweets.

To conclude being able to see others' tweets can result in self-assessment. Learners may assess themselves by exploring related tweets before gaining feedback from others. A further benefit is that learners have the chance to see more than a single answer to a particular question. The available evidence suggests that students found social media to be a tool that supports learning. This will be further explored in terms of learning theories in the next section.

To sum up, in the first factor there was an in-depth discussion related to the challenges that students faced during the integration of Twitter into their learning environment. It was found that most of the questionnaire responses were positive, showing that Twitter appears as a useful and helpful tool in a learning setting. These findings were also positively commented on by interviewees, providing a deeper understanding, examples and an extra explanation. Additionally, some learning theories were associated with the current results in order to strengthen and support the direct outcomes of the research.

On the other hand, some negative results were also found in the questionnaire responses. For instance, there were a few learners who disagreed with some questions and/or items in the

questionnaires. This indicated that even though Twitter was generally thought to be an effective tool in a learning setting, it may be seen as a negative tool by some groups of students. Further exploration of this can be found in the concluding chapter.

Having highlighted the perceptions of the effectiveness of Twitter, the following section will present a discussion regarding perceived obstacles and disadvantages of Twitter.

Table 6.1: Discussion summary: Challenges factor

Section		Source of data		Summary points of key findings	Related studies	Nature of contribution
		Questionnaire	Interview			
Place of activities	Before the class	√	√	<ul style="list-style-type: none"> Twitter helped more than half of the students to be ready for activities before coming to the actual class 	(Alhomod & Shafi, 2013)	Confirmation and extension in respect to different methods, study design and research sample background
				<ul style="list-style-type: none"> Task reminder 	(Tur & Marín, 2015)	Extension to different countries
					(Pavlovic <i>et al.</i> , 2015)	Confirmation
					(Lin, Hoffman, & Borengasser, 2013)	Confirmation with respect to different methods and design
	In the class	√	√	<ul style="list-style-type: none"> Convenient tool for discussions during class time. Feeling more comfortable engaging in discussions during class time More effective than Blackboard Improving the quality of the course Twitter should be used more in the course Sources of information for revision Changing the traditional class layout Twitter is better than other social media tools such as WhatsApp in terms of organisation Rich media tool Key points summary 	(Rinaldo <i>et al.</i> , 2011)	Confirmation based on different research background
					(Elavsky <i>et al.</i> , 2011)	Extension in the geographic area
					(Ebner & Schiefner, 2008)	Confirmation <i>via</i> mixed-methods
					(Ferenstein, 2010b)	Confirmation based on learners' perspectives
					(Jacquemin <i>et al.</i> , 2014)	Confirmation <i>via</i> mixed-methods
					(West <i>et al.</i> , 2015)	Extension (explaining the growth in tweets numbers by providing a possible example)
	Beyond the class	√	√	<ul style="list-style-type: none"> Powerful tool for extending educational activities beyond classroom 	(Ferenstein, 2010a)	Confirmation
					(Grossec and Holotescu, 2008)	Confirmation
				<ul style="list-style-type: none"> A supportive tool when learners are not attending the class (absent cases) 	(Ebner <i>et al.</i> , 2010)	Extension with non-experiment design
					(Menkhoff, Chay, Bengtsson, Woodard, & Gan, 2015)	Confirmation based on different research background
Dissemination		√	√	<ul style="list-style-type: none"> Promoting knowledge sharing Extending the sharing of knowledge to non-class members 	(Oye <i>et al.</i> , 2012)	Confirmation based on different research background
					(Alim, 2017)	Build upon existing knowledge and confirmation based on students' perceptions
					(Fox & Varadarajan, 2011)	Confirmation based on different research approaches
					(Becker & Bishop, 2016)	Extension and confirmation based on different sample backgrounds and grade (middle-grade classroom)
					(Huseyin Bicen & Cavus, 2012)	Contradiction
Communication		√	√	<ul style="list-style-type: none"> Communicating effectively among learners and between learners and instructor for educational purposes Easy to communicate with classmates 	(Bledsoe <i>et al.</i> , 2014)	Build upon existing knowledge and extension based on different sample grades and research approach
					(Roy & Chakraborty, 2015)	Build upon existing knowledge and extension based on different sample grades and research approach

Section	Source of data		Summary points of key findings	Related studies	Nature of contribution
	Questionnaire	Interview			
				(Ebner <i>et al.</i> , 2010)	Extension and confirmation
				(List & Bryant, 2008)	Confirmation
				(Junco <i>et al.</i> , 2011)	Association/ support
				(Oye <i>et al.</i> , 2012)	Confirmation
Interaction and collaboration	√	√	<ul style="list-style-type: none"> Students' interaction is improved in both during and after lecturer Students' interaction reaches all learners rather than peers only Interaction extends to a different class Learners were encouraged to interact with each other 	(McNeill <i>et al.</i> , 2016).	Confirmation
				(List & Bryant, 2008)	Confirmation based on different research approach and sample
				(West <i>et al.</i> , 2015)	Build upon existing knowledge and confirmation based on different research approaches
				(Becker & Bishop, 2016)	Confirmation based on different research approaches
Questions and answers	√	√	<ul style="list-style-type: none"> Questions and answers are very helpful Students enjoyed asking questions during lectures Asking and answering at the same time Questions and answering are limited for class members only 	(Alim, 2017)	Build upon existing knowledge and confirmation
				(Gonzalez & Gadbury-Amyot, 2016)	Extension and confirmation based on different research approaches
				(Pate, 2015).	Confirmation
				(Neal, 2012).	Confirmation
				(West <i>et al.</i> , 2015),	Build upon and confirmation
				(Knight & Kaye, 2014)	Contradicted
Understanding	√	√	<ul style="list-style-type: none"> Help achieve a deeper understanding of the educational topic Help to understand the argument around the topic Rich media helps learners understanding Self-correct 	(Yang <i>et al.</i> , 2014)	Confirmation based on different research approaches
				(Tur & Marín, 2015)	Extension and confirmation based on different research approaches
				(Zainal & Deni, 2015)	Contradicted
Twitter is more useful than I thought	√	√	<ul style="list-style-type: none"> Learners' feelings alter after using Twitter for learning 	(Osgerby & Rush, 2015)	Build upon existing knowledge
				(Parry, 2008)	Build upon existing knowledge and extension from different perspectives
				(Bista, 2015)	Confirmation and extend the result to undergraduates
Learning	√	X	<ul style="list-style-type: none"> Learning materials more effectively An easier way to improve learning 	(Junco <i>et al.</i> , 2011)	Confirmation and extend
				(Ebner <i>et al.</i> , 2010)	Confirmation based on different research approaches
				(Schroeder <i>et al.</i> , 2010)	Confirmation
Visibility of tweets to others	X	√	<ul style="list-style-type: none"> Source of learning Increase self-assessment 	(Osgerby & Rush, 2015)	Extension and confirmation

6.3 Obstacles and disadvantages of Twitter

Under this theme, there are two separate factors, namely the *obstacles* and *disadvantages of Twitter*. These factors address the negative facets of Twitter which might reduce the efficiency of such tools in the learning environment. Although these factors seem somehow similar in their overall concept, these were produced separately in the factor analysis. Thus, these factors will be discussed individually, on the basis that they were identified independently in the analysis procedure. It is important to note that social media conveys two aspects, namely social practices and the technology itself. Therefore, it is assumed that the ‘*obstacles*’ factor focuses on measuring the social practice through a technology tool in the learning environment, whereas the ‘*disadvantages of Twitter*’ factor measures the technology operated – Twitter. The outline of this section is presented as follows: firstly, obstacles (the second factor produced) will be discussed, focusing on evaluating each obstacle that students may encounter through the use of social media (Twitter) in the learning setting. These were identified as privacy, adverse impact on students, usability, organising presented information, internet connection, and addiction. Secondly, the focus of the argument will be shifted to discuss the disadvantages of Twitter (the fifth factor).

Barriers are the main factors that prevent students and teachers from obtaining the maximum benefits of social media implementation in a teaching and learning environment. It was seen that there were various obstacles in the existing literature. The main cause may not be clear as it differs based on countries where the research was conducted, the tool itself, prior experience or confidence. Increasing the benefits of social media for learning is the key goal of implementation processes in education. Therefore, knowing the obstacles could increase the instructors’ awareness, which could lead to minimising or overcoming these barriers. It seems that there are common obstacles among learners whereas the others could be considered as an individual’s barrier. In the educational environment, it should be highlighted that having technology fully integrated with no constraints may not be realistic, particularly with cutting-edge technology. The current research attempted to discover obstacles that learners encounter throughout using Twitter in the learning environment. Hence, the current research will seek to address the question, ‘*What are the obstacles to integrating Twitter in educational disciplines?*’. Having addressed this question, it would be interesting to find out the common barriers among Saudi students and those found in the existing literature.

The ‘*obstacles*’ dimension consisted of 10 items assessing several aspects of barriers using a five-point Likert Scale, ranging from ‘*strongly agree*’ to ‘*strongly disagree*’. It should be noted that items are written as negative sentences in the questionnaire. In this regard, the interpretations of these items are based on disagreement columns rather than agreement. Moreover, the interviews aid in understanding some barriers in more depth and lead to discovering new limitations. It

should be mentioned that the interview will contribute to only two elements—‘*privacy*’ and ‘*distraction*’—as this is what participants identified in the discussion.

The first element, ‘*privacy*’, is seen as a major hindrance during the implementing of social media for teaching and learning in some existing literature. Therefore, the current study asked the participants to respond to item 1 in Table 4.16, ‘*I do not want to share my private social life on social media with school*’. This item result ($M = 3.98$ neither agree nor disagree) is based on the number of participants in both agreement and disagreement rather than relying on the mean of the total participants. The majority of responses were in disagreement. Consequently, sharing private life alongside academic life *via* Twitter may not be considered as the main obstacle that prevents most of the students from implementing social media in their teaching and learning environment.

To illustrate this result, even though the disagreement responses are a little higher than agreement responses, the mean is categorised as ‘neither agree nor disagree’. There are several possible explanations for this result. It may indicate that some participants did not experience sharing their private life with academic life because either they do not share their private life in social media at all or they use different accounts for academic purposes. It should be noted that during this investigation, students were asked to respond to whether they used one account for both personal and academic purposes or they created another account for teaching and learning. The outcome showed that 28.5% (41 participants) used a separate account for teaching and learning, meanwhile, approximately 58% (84 participants) utilised one account for both purposes. An implication of this is the possibility that those 41 respondents may have not experienced personal and academic activities together in one account. Referring back to the privacy item, 30 participants chose neither agree nor disagree.

In terms of interview outcomes, few participants emphasised that they preferred a tool which is limited to their class only. For example, an interviewee said, ‘*I do not prefer to use a public and open tool; I prefer a limited tool for class only*’. Having this result could indicate that open and public tools (less privacy) may not be viewed as a major barrier for a large number of learners. However, students prefer to use a private tool which is limited to the classroom’s environment in terms of learning and communicating for educational purposes. This extends the understanding of earlier research conducted by Fox and Varadarajan (2011) who reported that the majority of students were not worried about their privacy while applying Twitter in their study. The current finding produced similar results to previous findings, namely that the majority of participants did not report privacy as a barrier for learning *via* social media. Nevertheless, interviews with participants uncovered further information, namely that students prefer to use private tools for their study. The prior research was limited to survey results, therefore, the current study attempted to employ a mixed-methods approach based on different participants’ backgrounds. In addition, this investigation builds upon the case study conducted by Lin *et al.* (2013) as even though participants did not particularly raise the issues of privacy, two of them recommended it is better

to have two separate accounts – one for personal tweets and the other for class requirements. This is important for those who are concerned about their social life. By contrast, other research conducted by Roy and Chakraborty (2015) revealed that most of the participants were worried about their privacy. This study is limited to a single country, Bangladesh. The contradiction in results may be due to the difference in the level of privacy among users along with how much privacy they share on an online platform; moreover, 96% participants of the study used Facebook only, which may be considered as a different tool and practice goal.

It should be highlighted that the level of privacy and shared personal information can be different among social media tools. A further explanation is that the nature of Twitter may differ from other social media tools, such as Facebook, in terms of sharing life information. This was confirmed by the findings of Pavlovic *et al.* (2015) who demonstrated that students saw Twitter as having more professional use while regarding Facebook as a network for entertainment. Hence, considering which social media tool should be used would be fundamental as it may influence the use of selected technology in education.

Viewed from another perspective, privacy is potentially more of a concern for educators or university demonstrators, rather than for students themselves. According to Al-Khalifa and Garcia (2013) and (Goldfarb *et al.*, 2011), privacy and security are the main barriers that prevent educators from integrating social media into the teaching and learning environment. Thus, in this regard, it is worth considering both users, as shared information can be related to both students and their instructors.

To summarise, privacy is the main concern among educators and learners in the educational environment. The present study attempts to add to the vast knowledge in this field, demonstrating that open and public tools may not be considered as a serious obstacle that prevents the majority of students from participating and engaging in learning through Twitter. However, it was shown that non-private tools appear unfavourable among some learners. It is recommended that some users may overcome this concern by either having separate personal and academic accounts or limiting sharing their personal life to certain social media tools such as Facebook or Snapchat, whereas Twitter can be used for less private aspects.

The next obstacle expressed by some educators who have indicated that social media should not be encouraged as part of the teaching and learning process (Tariq *et al.*, 2012). They emphasised that such tools adversely influence students' grammar, distract learners with non-academic issues, and waste time spent on social media. The current study attempted to address these concerns from the learners' perspective. The result of item 2 in Table 4.16 '*Twitter has badly affected my study*' was ($M = 2.16$ disagree). In this study, the majority of respondents denied the adverse effect of Twitter on their studies. This finding may help in increasing the credibility of the use of Twitter within the learning environment. However, the findings of the current study do not consistently

support the previous research which revealed a negative aspect of social media in education as it distracted students from learning, wasted their time, and drove students to use this media for non-educational purposes (Tariq *et al.*, 2012). This contradiction may be due to the fact that the mentioned paper did not provide empirical evidence and it was based only on the authors' views and expectations along with reporting five or more social media tools in general use. Furthermore, the authors seem to take a negative stance in relation to social media and education rather than avoiding bias.

In addition to the preceding arguments, '*chatting*' with friends on social media was reported as a barrier by some researchers (Oye *et al.*, 2012). Item 3 in Table 4.16 was introduced to the participants, '*Chatting with my friends distracts my study during lectures*'. The result, ($M = 2.35$ disagree), showed that non-educational discussions with friends are less distracting during lecture time according to the majority of participants. However, there are also a few participants who found chatting on Twitter during the lecture is distracting. This finding will be further explaining by qualitative data. Throughout the interview phase, students appeared to have positive feelings about Twitter in their learning. Conversely, one interviewee answered the question by reporting, '*Yes, in the classroom, I check others' tweets which are not related to the topic sometimes*'. However, the outcomes of this study did not show contacting for non-academic purpose as a distraction based on the majority of responses. This indicated that the majority of participants did not involve in non-educational discussions with others during lecture time or this occurred for a short time.

The current findings associated with Oye and colleagues' (2012) results who reported that one of the common activities among their participants was an informal conversation and discussion with classmates in relation to educational and academic topics of interest. This study also reported that chatting with friends about social and non-academic activities has a negative influence. It can be argued that social media is a tool that is operated for both aims (academic and non-academic). Thus, limited social media practice for academic purposes only may reduce the individuals' interests, which can be seen as a contradiction to the main purposes of social media practice. Having balance is an individual proficiency along with the importance of managing time efficiently and appropriately.

In contrast, the findings of the current study are contradicted with earlier research which found that nearly 71% of students responded that Twitter distracted them from course discussions and 69% of their participants found that Twitter was hindering them from taking notes as thoroughly as they desired because of overwhelming tweets and the sending of private messages between each other (Fox & Varadarajan, 2011). Interestingly, these were not reported through the current investigation. Notably, the former study conducted by Fox & Varadarajan (2011) relied on tweets posts and survey for data collection whereas the current research applied survey and interview for

data collection. There are several explanations for this result, firstly the current item used for assessing this matter emphasised non-academic interaction during the lecture time, whereas earlier research focused on informal socialising with friends. Secondly, it is possible to claim that students were not given sufficient class time and consequently did not take appropriate notes.

It is noted from the results that a few students report being distracted when Twitter is incorporated in their lectures. This is not surprising as it is consistent with some of the aforementioned research. Nevertheless, the difference is only that the current study found few participants reported Twitter was a tool of distraction, whereas some earlier research reported this was true for the majority of participants. Provided that Twitter is not a distraction in lectures based on the current findings, the following section will present the usability of this platform.

The current study considers previous individual experiences. The importance of questioning the usability of Twitter can be seen due to the claim that lack of experience sometimes is a hindrance when using technology. Therefore, it would be vital to evaluate this from the students' perspective. A related statement is item 4 in Table 4.16 '*I think lack of experience prevents me from using Twitter effectively*'. The result, ($M = 2.49$ disagree), indicates that having no previous experience does not appear to influence perceptions of the use of Twitter. The current result can add to the earlier research which discovered that graduate students who had no previous experience with Twitter admitted the platform offered them space and opportunities for engaging in academic practice (Bista, 2015). The present investigation adds to the wide body of knowledge that lack of experience does not prevent undergraduate students from using Twitter effectively. Unfamiliarity with Twitter and not knowing how to reply or use hashtags is also an initial concern for students (Lin *et al.*, 2013). The current findings regarding lack of experience may provide instructors confidence in that expert and non-expert students users are able to gain the benefits of using Twitter. This will be addressed further in the infernal analysis section.

Having information logically organised is a significant factor that reduces the level of confusion during the learning process. The current study attempted to demonstrate this based on students' viewpoints. Participants were presented with item 5 in Table 4.16 '*The information on Twitter is illogically organised and confusing*'. The result was ($M = 2.71$ neither agree nor disagree). Even though the disagreement responses (44.40%) are almost double the agreement responses (26.40%), the mean is placed on '*neither agree nor disagree*'. Therefore, the result of this item is based on the number of participants in both agreement and disagreement rather than relying on the mean of the total participants. The highest number of responses for this item was disagreement. Based on this, the finding showed that learners found the information on Twitter logically organised and not confusing. While the current result showed some respondents found social media confusing, this linked to the qualitative case study that was reported by Lin *et al.* (2013) who found few participants saw a large number of tweets which emerged for non-

classroom related content as a continuous issue. A possible explanation is an expectation of having a large number of tweets which are not related to the learning environment, unless a different account is used. This also could increase the importance of applying hashtags that contain an individual concept or a single educational topic in order to reduce the confusion that some learners may face. In the cited study, learners revealed that there were issues related to their awareness of how to reply or use hashtags, thus, it can be claimed this caused confusion. Both results can indicate that the possibility of increasing the effectiveness of Twitter can be both how it is employed in the learning setting (method) along with the affordance of the platform itself. It should be noted that approximately 26% of the current participants agreed to the given item in the questionnaire.

It is perhaps difficult to explain this result, but it might be related to the overall organisation, such as how Twitter is applied, the way in which questions and information are tweeted, and the way users respond to each other. Moreover, providing a thorough introduction to how Twitter can be utilised for teaching and learning purposes may reduce confusion. As mentioned in the literature review, tweeting with the use of an appropriate hashtag results in not missing the tweets afterwards due to the fact that using particular hashtags help users to locate all tweets they post and are required in particular virtual categories. Luo and Dani (2015) discovered that students were easily able to post and provide feedback on Twitter. However, they sometimes struggled in locating and retrieving their posts and feedback afterwards. The earlier report was limited to 30 students; moreover, Twitter was only incorporated to provide in-real-time feedback as the teaching process was taking place.

The consistent result can be seen in that although Twitter provides wide access to a variety of information, five master of art students out of 62 felt overwhelmed by the massive amounts of information (Bledsoe *et al.*, 2014). This result associated with the current in that the negative side was reported by only a few respondents. It should be noted that the sample of cited research was master students whereas the sample of this study was undergraduate students.

It is known that social media including Twitter has no limits in terms of time and place for access. However, difficulties in access might arise from the internet connection, technical issues, or availability of devices. Learners were asked to respond to item 6 in Table 4.16 '*There are accessibility issues within Twitter from time to time*'. The result, ($M = 2.53$ disagree), indicated the majority of students reported that they did not have difficulties in accessing Twitter. However, there were some participants who found difficulties in accessing Twitter from time to time. Looking at the literature, this expounds findings by Lackovic *et al.* (2017) who found six participants out of 43 did not have smartphones, which hindered their access to Twitter. Both findings (current and cited research) reported difficulties related to Twitter based on a minor number of participants. Therefore, although the number of responses was very low, this should

be recognised as a barrier faced by some during the integration. In addition, another important finding was the responses to item 7 in Table 4.16 '*I do not have sufficient access to the Internet*' (M = 2.29 disagree). Based on the majority of responses, the result demonstrates that there were no internet access issues. Nevertheless, since internet connection was reported as an issue by a few students, this study produced results which corroborates the findings of the previous work in this field conducted by Alim (2017) who reported internet connection is an obstacle in some cases based on academics' comments. Therefore, the availability and speed of the internet in the classroom may hinder accessing social media in Saudi Arabia, as this was reported by a few students (current research) and academics (cited research).

It can be concluded that such issues are more likely to be recognised as a general technology drawback rather than relating to only social media itself. For instance, technical and internet connection issues can occur for any technological devices.

Additionally, addiction and spending excessive time on social media is seen as another drawback for social networks and therefore may affect students' performance and limit their communication in person (Roy & Chakraborty, 2015). Generally, the study highlighted that there is a negative impact of social media on users who spend excessive time on such tools. The present study is designed to address item 8 in Table 4.16 '*Using Twitter for the study requires too much of my time*'. The result, (M = 2.54 disagree), indicated that Twitter did not require too much of students' time as reported by the majority of respondents. It should be noted that the item was employed to only investigate whether or not using Twitter for educational purposes requires exclusive time rather than general Twitter use. However, Roy and Chakraborty (2015) investigated the overall influence of social media including Facebook, Myspace, Twitter and YouTube in education, based on a low number of participants (50 questionnaires); 96 % of their sample used Facebook only. In addition, West *et al.* (2015) reported (questionnaire only) that students disagreed to the statement that *Twitter 'was a waste of time'*, emphasising their agreement to that they enjoyed using Twitter in their learning process. The current study extended prior results to a different country and confirmed the research *via* mixed methods.

The present findings contradicted with Oye and colleagues' (2012) outcomes, namely that students who planned to use social networks for a few minutes found themselves spending hours on these platforms. The study focused on academic performance reporting several social media tools in general rather than incorporating and measuring a particular tool in the learning environment. Time wasting is a key issue because some published research demonstrated that spending too much time using social media has a significant adverse effect on learners' academic achievement (Paul *et al.*, 2012). Nonetheless, although a negative correlation was found in the prior research, some of the literature found no relationship between time spent on social media and academic performance (Alwagait *et al.*, 2014; Ozer *et al.*, 2014). The current study applies

Twitter in particular for learning areas. Indeed, the result of this study did not show that Twitter requires excessive time based on the majority of responses. Hence, issues related to excessive time may be seen as a result of time management, which varies among individuals.

The current study also presumes that a lack of motivation and encouragement would result in decreasing the benefits of Twitter. According to Veletsianos and Navarrete (2012), students did not engage in activities with each other except when required for course credit or when motivated by instructors. Hence learners were given item 9 in Table 4.16 '*I have lack of motivation and encouragement from my instructor*' (M = 2.39 disagree). This outcome showed that the majority of participants received motivation and encouragements from their instructors. The lecturers' encouragement is more likely to contribute to increasing the benefits of Twitter in a learning environment. This also builds on the outcomes that there was an increase in student engagement and grades when students were required to use Twitter; in contrast, this increase was not seen when the use of Twitter was optional (Junco *et al.*, 2013).

To summarise, in the current study, the participants were motivated by the instructor. Based on both pieces of literature, instructor encouragement appears an essential element during the integration of social media. Thus, instructor encouragement contributes to successful social media integration.

To conclude, according to the majority of participants, no key obstacles were found during the integration of Twitter in the learning environment. However, there are some relevant aspects which need to be highly considered. For instance, privacy is not a big concern; however, it can be admitted that using limited tools in the classroom appears preferable. Moreover, applying Twitter correctly leads to reduced distractions, preparing classroom infrastructure such as ensuring the availability of the internet is required, and encouraging and motivating learners to use technology for the study seems an important factor.

It is worth stating that since these tools are not specifically produced for academic purposes, users might not apply them in academic areas correctly unless they are interested or encouraged. Like any other technological tool, Twitter could divert users' focus as they need to log on and follow participatory activities. Even though irrelevant tweets may pop up and direct users to non-academic purposes, Twitter seems to have fewer distractions as the notifications can be turned off and, therefore, be beneficial if applied correctly. Additionally, using hashtags is a remarkable feature in Twitter because it groups all relevant tweets under a certain topic. This may be seen as a method that reduces non-academic interaction.

At this point, the discussion regarding the obstacles of social practice *via* Twitter in relation to learning aspects is completed. The next section examines the '*disadvantages of Twitter*' in the learning setting, focusing on the platform's capabilities in this regard.

Table 6.2: Discussion summary: Obstacles factor

Section	Source of data		Summary points of the findings	Related studies	Nature of contribution
	Questionnaire	Interview			
Privacy	√	√	Privacy not a major obstacle Students prefer private rather than public	(Fox & Varadarajan, 2011)	Extension and confirmation based on a different research approach
				(Lin <i>et al.</i> , 2013)	Build upon and confirmation
				(Roy & Chakraborty, 2015)	Contradiction
Should not be encouraged for teaching and learning	√	√	Twitter does not badly affect learners' study Communication with friends for non-academic purposes did not distract students during lectures	(Tariq <i>et al.</i> , 2012).	Contradiction
				(Oye <i>et al.</i> , 2012).	Extend
				(Fox & Varadarajan, 2011)	Contradiction
Prior individual experience	√	X	lack of experience does not prevent students from using Twitter effectively	(Bista, 2015)	Build upon existing knowledge and confirmation
Illogical information and confusing	√	X	Information in Twitter can be logically organised	(Lin <i>et al.</i> , 2013)	Built upon existing knowledge based on a different research approach
				(Luo & Dani, 2015)	Contradiction
				(Bledsoe <i>et al.</i> , 2014).	Extend
Access difficulties	√	X	Few issues related to accessibility and internet	(Lackovic, Kerry, Lowe, & Lowe, 2017)	Confirmation
				(Alim, 2017)	Extension
Addiction and excessive time spend on social media	√	X	Twitter does not require excessive time	(Oye <i>et al.</i> , 2012)	Contradiction
				(West <i>et al.</i> , 2015)	Extension and confirmation based on a different research approach
Lack of motivation and encouragement	√	X	Learners were motivated and encouraged	(Veletsianos & Navarrete, 2012)	Build upon existing knowledge
				(Junco <i>et al.</i> , 2013)	Build upon existing knowledge

6.4 Disadvantages of Twitter

This section undertakes the discussion of the fifth factor – the disadvantages of Twitter. In this factor, there are four items grouped independently as a result of factor analysis; discussing these items individually and in-depth are the main focus in the current section. It should be noted that these items are more about the disadvantage of Twitter itself rather than social media practices which were discussed earlier in the obstacles factor. Measuring the disadvantages of Twitter provides educators confidence in applying this tool into the learning environment.

It should be noted that items in this factor are written as negative sentences. Hence, the discussion of results will rely on the mean and number of responses in the disagreement column.

The first item in Table 4.17 is *'Twitter was a distraction to learning in the course'* and the result was ($M = 2.33$ disagree). The current study revealed that the majority of the participants found Twitter was not a distracting tool for learning in their course. Consequently, studying and learning in the courses are not adversely influenced by Twitter integration. This supports earlier research conducted by West *et al.* (2015) who reported that students disagreed to Twitter as a learning distraction. Conversely, they enjoyed using Twitter as a learning tool. However, the findings of the current study do not support the previous research conducted by Fox and Varadarajan (2011) and Oye *et al.* (2012) (see prior section (obstacles), particularly the concept that Twitter should not be encouraged in the learning environment).

The mean for item 2 in Table 4.17 *'Twitter has inhibited my participation in the debate'* was in disagreement ($M = 2.56$ disagree), indicating that Twitter does not inhibit learners from participating in debates. This confirms earlier research in this field which found that only 1.89 % of participants out of 54 respondents reported that Twitter inhibited them from participating in debates, which is considered as a low percentage (Tur & Marín, 2015). The study was conducted in Spain using content analysis and interview as the main source of data whereas the current conducted in Saudi Arabia used questionnaires and interview as the source of data. The current result confirms this notion, as both studies produced similar outcomes.

The mean of item 3 in Table 4.17 *'Twitter has not helped me at all to understand the topic and argument in the debate'* was ($M = 2.48$ disagree). The results of the current study suggested that even though a few learners agreed to the prior two items, the majority agreed that applying Twitter in a learning environment does not prevent learners from participating and understanding an ongoing debate. This also confirms findings from an earlier investigation conducted by Tur and Marín (2015) which found that only 16.98% of their participants out of 54 reported that Twitter has not helped them at all to understand the topic and argument in the debates related to their courses.

The mean of item 4 in Table 4.17 '*Twitter has caused more confusion than understanding*' was (M = 2.44 disagree). In this study, the outcome indicated that Twitter did not cause confusion. However, although the vast majority of respondents found Twitter was not confusing, there were few learners who found it confusing. The result of this item builds upon previous research which presented that approximately 3.77% of the 54 participants found debating on Twitter had caused more confusion than understanding, whereas the majority of students found it was not confusing (Tur & Marín, 2015). A possible explanation for this might be that as these results are based on a low percentage of people, this may be caused by either misuse of the tool itself or students might depend on another tool for gaining understanding. Moreover, they may have had less interest in Twitter as a tool for understanding the topic.

To summarise this section, the current study showed that learners did not agree with the proposed statements for measuring the disadvantages of Twitter. This indicated that Twitter is more likely to be suitable for the learning environment. Highlighting the ways users (instructors and students) apply and utilise this platform is seen as the main aspect for boosting or reducing the success of Twitter incorporation. This leads to discussion regarding the positive capacity of Twitter in the learning environment, which will continue in the next section.

There are similar results between the current results and Tur and Marín's (2015) research. The possible explanations are listed below:

- Both studies provided an introduction about the terminology of Twitter along with how to use the platform and hashtags in relation to learning environment.
- Both studies provided a description related to activities in a face-to-face setting.
- Students in both studies were motivated and encouraged by instructors.

Table 6.3: Discussion summary: Disadvantages of Twitter

Section	Source of data		Summary points of findings	Related studies	Nature of contribution
	Questionnaire	Interview			
Distraction	√	X	Twitter does not distract learning in the course	(Oye <i>et al.</i> , 2012).	Contradiction
				(Fox & Varadarajan, 2011)	Contradiction
				(West <i>et al.</i> , 2015)	Extension and confirmation based on a different research approach
Inhibited my participation	√	X	Twitter does not inhibit learners to participate in debates	(Tur & Marín, 2015)	Build upon existing knowledge and confirmation
Understand	√	X	Twitter helps learners to understand the topic and argument in the debate	(Tur & Marín, 2015)	Build upon existing knowledge and confirmation
Caused more confusion	√	X	Twitter has not caused confusion more than understanding	(Tur & Marín, 2015)	Build upon existing knowledge and confirmation

6.5 Positive capacity

This factor was produced by factor analysis and consists of four items gauging the positive capacity of Twitter in a learning setting. It is assumed that technologies are diverse in their capacities, particularly when brought into educational aspects. Determining the positive capacity of Twitter in relation to education was measured by the current research. Twitter has many features which may be considered as positive or negative in terms of learning. This study aimed to evaluate four elements based on students' perceptions. In this section, the discussion will be emphasised more on Twitter technology and how it may serve learning and students in terms of sharing educational resources, communicating with classmates about course-related topics, being encouraged for posing questions, and achieving educational goals. As mentioned in the literature review, Twitter was reported as a tool that allows users to exchange and share educational materials based on experimental design (survey only) at ICT college (Pavlovic *et al.*, 2015). The current study's non-experimental mixed-methods approach builds upon and confirms the previously cited research. A related statement is item 1 in Table 4.18 '*Twitter allows me to find and share educational resources*' (M = 3.92 agree). The current finding revealed that Twitter allows users to find and share educational resources. Further data was obtained throughout the second stage of collecting data, which can be seen as explanatory for the quantitative results; nearly all interviewees stated that they were able to share all the tweets and photos relating to the educational topic with classmates. An example is an interviewee stating, '*yes, I am able to share all the related and various tweets with regards to educational topics*'. Another participant responded that '*it is better in sharing knowledge with others from different classes*'. The majority of those who responded to this matter felt that Twitter facilitates sharing related information with both their classmates and others in different classrooms who studied the same subject. This confirms and expounds an existing study by Kassens-Noor (2012) who stated that Twitter surpasses traditional classes by providing facilities such as sharing and creating ideas. This confirmation can be seen in the way that prior research provided findings based on the experimental design with a low number of respondents (15); whereas the current investigation provides consistent results based on a non-experimental design with a larger number of respondents (144). These findings further build upon the result of Pate (2015) who reported that students shared references and note-taking *via* Twitter. The geographic location for previous research was the UK, while the current study chose Saudi Arabia as the geographic area. The current mixed methods approach confirmed a survey conducted by Anthony and Jewell (2017, p. 43) who reported that 82% out of 198 students '*agreement*' with the statement, "I think Twitter is an effective tool for sharing resources". The current finding highlighted that the possibilities of sharing information with other classes *via* Twitter are achievable. This can be seen as an important

contribution to the wide body of knowledge particularly when more than one class are studying the same subject during the same semester.

Communicating with peers is a key element of integrating social media into classes. However, communication may not always signify that students are connecting with each other for learning purposes; as discussed earlier, it can be for socialising and leisure purposes with no academic connection. Therefore, the statement offered to the participants was item 2 in Table 4.18 *'Twitter allows me to communicate with classmates about course-related topics'* (M = 3.86 agree). The outcome indicates that learners find Twitter as a place where they communicate with each other for course-related topics. This is expounded in more detail from the interviews.

In the interviews, most of the learners preferred the way that they think and study together in the class and then posting their final answer in selected classroom hashtags, maintaining their communication on the platform. For instance, one interviewee responded with *'Yes, I like the way we think together in the classroom, then we respond to and communicate in the class hashtag'*. In addition, an interesting result was revealed by an interviewee who mentioned that using Twitter *'helps me when I do not go to the class'*. This is an ideal sign, indicating that the assistance which absents learners approached *via* Twitter are more likely to be the result of communication for educational purposes. Additionally, another statement from a participant in response to the Twitter question in this regard was *'Yes, it is easy to connect and discuss with friends for learning purposes and talking about the requirements'*. The current finding along with quantitative results showed that Twitter has a positive capacity for learners to establish and sustain communication for educational goals. Moreover, absent learners were able to communicate and inquire about missed coursework. Indeed, students can potentially benefit from Twitter when they work together towards certain educational objectives. The current results confirmed Pavlovic and colleagues' (2015) study (survey) who found students communicated with their professor and other students that went beyond working hours and the classroom for educational purposes. The current results are consistent with those of other studies who reported Twitter helps learners to communicate with their classroom group members in real time (Bledsoe *et al.*, 2014). The previous study was limited to 62 graduate students in the USA. Thus, the current study attempts to expand this finding to undergraduate students along with applying a mixed-methods approach. In addition, based on a single method approach (qualitative), Helvie-Mason and Maben (2017) reported that students appreciated Twitter as a real mode of communication wherein their studies are supported as opposed to merely being a platform for social interaction or daily gossip. This highlighted the suitability of Twitter in relation to communication and learning. This is approved and extended by the current finding's mixed-methods approach given participants agreed Twitter allows them to communicate with classmates about course-related topics; this is also expounded by the interview outcomes. Hence, both studies exhibited the competence of Twitter in communication for learning purposes which goes beyond social interaction.

Asking questions *via* Twitter was also discussed in the challenges section so this is likely seen as a confirmation. For item 3 in Table 4.18, *'I am encouraged to ask questions via Twitter'*, the result was ($M = 4.03$ agree). The data appears to suggest that learners felt motivated to tweet questions *via* Twitter. Linking to the interview outcomes, a vast majority of participants reported that they were able to ask their peers or instructors about their study. For example, an interviewee reported *'I can ask for assistance when I need to'*. This result is a good sign that users were able to ask and have their inquiries answered, otherwise, they would stop posing questions. However, participants did not directly acknowledge how they were encouraged by Twitter, but that can be seen in two facets – one could be related to shyness and the other might be related to how questions were answered. The concept of shyness will be discussed in depth in the last factor (personalisation). In relation to existing literature, the present results and previous studies have demonstrated that asking questions *via* Twitter seems a common activity (Alim, 2017). This substantiates previous findings by Pate (2015) who encouraged students to tweet while adopting a student-centred active learning approach and found that learners had a higher level of confidence to ask, comment, and contribute. The current results are also consistent with Pavlovic *et al.* (2015) who reported Twitter enhanced learners' motivation to actively participate in the learning process. Thus, based on both current and previous outcomes, Twitter appears to be an encouraging environment wherein users are motivated to ask questions; throughout Twitter, a learner's voice can be heard by instructors.

This is a significant result as it linked to the concept that maximising and minimising the effectiveness of Twitter in learning disciplines is likely to depend on the level of encouragement and helping each other *via* Twitter.

The final item 4 in Table 4.18 was *'My educational goals are being met'* ($M = 3.76$ agree). The majority of those who responded felt that their educational goals are being met. Meeting such goals are possibly accomplished by asking questions, receiving answers, engaging with activities, being motivated to learn, being productive, communicating with others for learning purposes and extending the learning landscape beyond classrooms and institutions. This is also in accord with our earlier research which showed that Twitter continues to show great findings, both in enhancing learners' motivation to actively participate in the learning process, along with the quality of the knowledge acquired through the platform (Pavlovic *et al.*, 2015). This positive outcome indicates that Twitter assessed learners to meet their educational goals; this can be seen as confirmation of earlier findings which suggest that Twitter facilitates learning *via* information sharing, ongoing event awareness, advocacy efforts, and also by enhancing the connections among learners, professionals, and faculty members (Anthony & Jewell, 2017). Supplementing the approach of educational aims which was found in the current research supports previous survey-based experiments which claimed that Twitter is a valuable platform to complement traditional forms of instruction (McArthur & Bostedo-Conway, 2012). The present study built

upon research conducted by McLoughlin and Lee (2008) who acknowledged that social technology allows facilitating and accomplishing learning expectations and goals.

To summarise, the current section provided evidence that Twitter can serve as a learning tool in terms of sharing resources, facilitating communication and encouraging students to tweet their inquiries along with its potential in facilitating educational goals. The next section aims to discuss the engagement level for educational relevancy *via* Twitter.

Table 6.4: Discussion summary: The positive capacity of Twitter

Section	Source of data		Summary points of findings	Related studies	Nature of contribution
	Questionnaire	Interview			
Sharing educational resources	√	√	<ul style="list-style-type: none"> Twitter facilitates sharing related information with both their classmates and others in different classrooms who studied the same subject 	(Pavlovic <i>et al.</i> , 2015).	Build upon existing knowledge and confirmation based on different research background
				(Kassens-Noor, 2012)	Build upon existing knowledge and confirmation based on different research background
				(Pate, 2015)	Confirmation based on different research background
				(Anthony & Jewell, 2017)	Confirmation based on different research background
Communicating with classmates	√	√	<ul style="list-style-type: none"> Establishing and maintaining communication for educational goals 	(Pavlovic <i>et al.</i> , 2015).	Build upon existing knowledge and confirmation based on different research background
				(Bledsoe <i>et al.</i> , 2014)	Build upon and extension based on different sample grades and research approach
				(Helvie-Mason & Maben, 2017)	Confirmation and extend based
Being encouraged to ask questions	√	√	<ul style="list-style-type: none"> Learners felt motivated to tweet questions <i>via</i> Twitter 	(Pate, 2015)	Build upon existing knowledge and confirmation based on different research background
				(Pavlovic <i>et al.</i> , 2015)	Build upon existing knowledge and confirmation based on different research background
Achieving education goals	√	X	<ul style="list-style-type: none"> Twitter assesses learners to achieve their educational goals 	(Pavlovic <i>et al.</i> , 2015).	Build upon existing knowledge and confirmation based on different research background
				(Anthony & Jewell, 2017)	Build upon existing knowledge
				(McArthur & Bostedo-Conway, 2012)	Build upon existing knowledge
				(McLoughlin & Lee, 2008)	Build upon existing knowledge

6.7 Engagement

Engagement is the fourth factor in the present investigation. It encompassed five sub-questions seeking to measure students' engagement in relation to educational activities. This section aims to address the question: *'To what extent do students engage via Twitter for educationally relevant purposes?'*. Addressing this question will rely on five sub-questions that were provided to the participants based on a Likert scale ('Very often', 'Often', 'Sometimes', 'Rarely' and 'Never'). As engagement can be measured by different models, in the current research, engagement is evaluated based on the amount of time and effort students put into their educational activities *via* Twitter (Kuh *et al.*, 2006) This is important as engaging students in a learning environment is a key step in educational activities.

In existing studies, there are some concerns related to maintaining a student's engagement in educational activities (Dhir *et al.*, 2013). Fundamentally, it is vital to point out that the usage of educational technology appears to boost students' engagement. The evidence was provided by L. Chen and Chen (2012) who found that learners continually engage in generating something which is meaningful to them. Hence, incorporating social media might be seen as a method to increase students' engagement. Consequently, Twitter has been identified as a tool that can lead to enhancing students' engagement in educational activities (Evans, 2014; Veelo, 2009).

It should be noted that the current presentation and discussion are slightly different from early factors. In this section, the entire results of all sub-questions will be presented following each other. Afterwards, these outcomes will be discussed in depth along with existing research. The reason behind this structure is that the current section emphasises measuring the students' overall engagement rather than focusing on a single statement for each item or question. All of the provided statements reflected the students' overall engagement in certain aspects. Hence, together, all the statements will be used to demonstrate learners' engagement rather than discussing each sub-question individually. It worth noting that engagement evaluation highly relies on the time and effort students put into all their educational activities *via* Twitter.

The first sub-question in Table 4.19 was *'How often do you ask questions or participate in class discussion?'* (M = 3.72 often). Interestingly, no responses were recorded in the 'Never' column. The most remarkable results emerging from the data is that participants often engage in class discussion and ask questions. This result also revealed that all of the participants experienced this activity because none of them reported 'never'. This indicates that learners often spend time and put the effort into asking questions or participating in class discussions *via* Twitter. Participants often engage *via* Twitter for education and therefore, engage in learning activities.

The second sub-question in Table 4.19 was *'How often do you discuss grades or assignments with an instructor via Twitter?'* (M = 3.39 sometimes). This outcome revealed that students

sometimes discussed grades and assignments with their instructor, whereas a small minority reported that they never discussed these with their instructor *via* Twitter. This may be due to the fact that Twitter is not a private tool and therefore some students did not want to reveal their grades to the public. Contemplating this result indicates that even though users are allowed to communicate with their instructor privately, discussing grades occurs less often on the private and public platform.

The mean regarding the third sub-question in Table 4.19 '*How often do you discuss ideas from your readings or classes with faculty members outside of class?*' was ($M = 3.08$ sometimes). This result indicated that participants sometimes involve this activity. Surprisingly, there are a minority of students who never discussed ideas from their readings or classes with faculty members outside of class.

The fourth sub-question in Table 4.19 was '*How often do you discuss ideas from your readings or classes with others outside of class (students, family members, co-workers, etc.)?*'. The result was ($M = 3.35$ sometimes), suggesting that students sometimes discussed their ideas with others who are not their instructors or classmates. This indicates that as social media is an open platform to the public, users sometimes get involved in discussions with non-class members.

The final sub-question Table 4.19 was '*How often do you work with faculty members on activities other than coursework (committees, orientation, student life activities, etc.)?*'. The result, ($M = 2.81$ sometimes), indicates that participants sometimes engage in non-coursework activities. Consequently, the current findings suggested that even though open and public tools were introduced into classrooms for educational purposes, the participation sometimes works with facilities members in activities.

The students' engagement for educational relevancy appears as '*often*' in the first sub-question and '*sometimes*' in the others. A close look at the results revealed that through the use of Twitter, learners engage more with classroom members (students and instructors) *via* asking or participating in classroom discussions, regardless of whether they discuss their grades with instructors. The current findings build on Junco and colleagues' (2011) study that found there was an increase in engagement score of the experiment group during the use of Twitter for educational purposes. The current study incorporated Twitter in a non-experimental design which also confirmed preceding findings. This findings further supports the conclusions of Dunlap and Lowenthal (2009) and Neal (2012) who discovered that Twitter could play an important role in elevating the level of engagement in online courses among students, as well as among students and their instructors. Furthermore, consistent with previous findings, these outcomes can also be applied to confirm an earlier report by Veelo (2009) who acknowledged that integrating Twitter in learning activities boosts students' engagement even beyond class. In addition, the present findings suggest that learners often engaged in course-related activities (asking or participating)

with class members. In accordance with the present results, previous research has demonstrated that students did not engage in activities with each other except those required for course credit (Veletsianos & Navarrete, 2012). The research limited students' engagement to graded activities with classroom members, whereas the current study showed that the engagement occurred often with classroom members in both graded and non-graded activities.

The current outcomes further support the potential of Twitter itself in boosting students' engagement which was found by other researchers (Evans, 2014; Junco *et al.*, 2011; Veelo, 2009). In addition, this study confirms and extends the conclusion that Twitter positively contributes to students' engagement (West *et al.*, 2015).

However, it should be highlighted that not all social media tools appear as a supportive method for boosting learners' engagement. For instance, unlike Twitter, Cole (2009) found that Wiki has little effect on students' engagement because the participants did not post to this platform. Together, based on the current investigation and previously cited research, it is possible that social media tools vary in their use and impact on students' engagement, although Twitter can be considered as an effective tool for student engagement.

To summarise, the current study provides evidence that Twitter is a tool that has the potential to increase students' engagement in educational aspects. This evidence is based on time and effort learners put into their educational activities. Moreover, this outcome is built upon other studies reported by Evans (2014) who discovered a strong correlation between the amount of Twitter utilisation and learner engagement. It is worth mentioning that this result helps to understand that students would not often participate if they did not find responses to their inquiries. It further contributes to covering more geographical areas, since the sample of the current study is in Saudi Arabia and the language used is Arabic. It is interesting to note whether these differences in place and language would uncover different results. Having the same results in existing literature along with data derived from completing 144 questionnaires leads to generalising the current finding.

The subsequent section undertakes the discussion of the sixth factor.

Table 6.5: Discussion summary: Engagement

Section	Source of data		Summary points of the findings	Related studies	Nature of contribution
	Questionnaire	Interview			
Engagement	√	X	<ul style="list-style-type: none"> • Participants often engage in class discussion and ask questions • Students sometimes discussed grades and assignments with their instructor • Students sometimes discussed their ideas with others who are not their instructors or classmates • Participants sometimes engage in non-coursework activities 	(Junco <i>et al.</i> , 2011)	Build upon related literature
				(Dunlap & Lowenthal, 2009)	Build upon related literature
				(Neal, 2012)	Build upon related literature
				(Veelo, 2009)	Confirmation
				(Veletsianos & Navarrete, 2012)	Build upon related literature and confirmation
				(West <i>et al.</i> , 2015).	Build upon related literature and confirmation

6.9 Pedagogical potential in higher education (personalisation)

This final factor in the current investigation consists of three items measuring the pedagogical potential of Twitter in terms of learning. In higher educational environments, applying technological tools produces various pedagogical potential. These potentials are key elements in improving learning strategies. It is believed that each technology is unique in its own possibilities. Twitter has been proven to be an effective pedagogical tool that can be applied in the classroom (Rinaldo *et al.*, 2011). Evaluating Twitter's potential in higher education is the major step in the current study. This evaluation is derived from Saudi learners' perspectives. In order to address the question '*To what extent do students believe social media (Twitter) offers pedagogical potential in their learning environment?*', the result of three related items will be reported. The outline of this following section is similar to the former sections.

The first item in Table 4.20 was '*Twitter allows me to share my academic interests*' and the result was ($M = 4.04$ agree). The vast majority of those who responded to this item agreed that Twitter allows them to share their academic interest. The interview data extend this by providing an example of further interest. Some participants used Twitter for more than course requirements such as developing other learning skills: '*I use it more for developing other skill such as asking people about English language vocabularies, especially, when the vocabularies are not clear in google translation*'. The current result further supports the previous study which found that Twitter enabled 93% of the middle-grade students to share their educational views with others from outside their class (Becker & Bishop, 2016). The current research expounds the previous study to the undergraduates. This also builds upon research by Pate (2015) who reported that students shared their interest in references and note-taking using Twitter. Having current results consistent with previous research findings indicates that Twitter has the potential to allow users to share their academic interests. In addition, this is considered as a confirmation for the positive capacity section because both provided positive results.

The next item in Table 4.20 was '*Twitter allows me to personalise and express individuality and creativity*' ($M = 4.24$ strongly agree). This study has been able to demonstrate that Twitter allows learners to personalise and express their individuality and creativity. Interestingly, this item has the highest mean (Strongly agree). This outcome is further supported by an interesting result that was discovered during the interview stage. Respondents were asked about the usefulness of Twitter in their learning environment. Some interviewees responded that they were able to develop their academic and personal skills *via* Twitter, such as asking users about academic issues or seeking English language conversationalists and translation. Thus, they become more confident and less shy in participating. For instance, one interviewee said that '*Twitter is better because I can take my time in responding and it has reduced the level of shyness*'. Another important finding was uncovered in interviews. Respondents found Twitter to be better than discussion in a typical

classroom by expressing that they were able to take more time in responding to the imposed question, evidenced by a participant's response: *'I can answer at any time after more reading.'* This finding supports the quantitative finding as it explains further how Twitter assists learners to express themselves.

This finding also confirms a study which reported that 81% of participants out of 131 students (in a pharmacy management course) insisted on the importance of Twitter in expressing their thoughts to the class that otherwise cannot be done (Fox & Varadarajan, 2011). The previous study applied questionnaires and tweets posts for collecting data, whereas the current study obtained data through questionnaires and interviews. Thus, having both studies provide similar results based on different research sample backgrounds and different research approaches leads the current study to confirm previous research. The result can be further associated with the notion that students are sometimes less confident and comfortable in face-to-face discussions in the classroom. In solving this matter, it was discovered that learners feel more confident communicating with classmates or instructors through computer-mediated communication (Chester & Gwynne, 1998). Hence, Twitter is also considered as a tool that enhances students' confidence.

The mean of the final item in Table 4.20 *'Twitter allows me to hold forums to discuss academic topics of my interest'* was ($M = 4.13$ agree). This result builds on those observed in earlier studies (academic usage) which found that students use Twitter to generate educational discussions with peers and chat with classmates in relation to their educational interests (Oye *et al.*, 2012). Together, these findings corroborate the ideas of Luo and Dani (2015) that Twitter is an effective tool that can be used in combination with other peer interaction activities in the educational discipline. Foregoing outcomes value Twitter in allowing users to discuss their academic topic of interest as users can discuss with peers or other members according to their preference. Moreover, the current findings together with previous research confirm that Twitter's users could utilise the platform as a community building tool and personal learning network (Chamberlin & Lehmann, 2011).

In addition, the current findings appear to support the concept of the personal learning environment (PLE) in terms of sharing resources rather than protecting them, and also allows creativity such as editing, expressing individuality and republishing of recourse, rather than being provided with pre-packaged learning objects. In the current finding, students agreed that Twitter could possibly assist in easily sharing academic interests with other students *via* the hashtag function. Furthermore, interestingly, it was discovered that learners 'Strongly agree' Twitter can possibly allow them to personalise and express their individuality and creativity.

Table 6.6: Discussion summary: Pedagogical potential in higher education personalities

Section	Source of data		Summary points of findings	Related studies	Nature of contribution
	Questionnaire	Interview			
Sharing academic interest	√	√	• Twitter allows students to share their academic interest	(Becker & Bishop, 2016)	Extension
				(Pate, 2015)	Build upon related literature
Personalise and express individuality	√	√	• Twitter allows learners to personalise and express their individuality and creativity.	(Fox & Varadarajan, 2011)	Confirmation
Discussing academic topics of my interest	√	X	• Twitter allows students to hold forums to discuss academic topics of their interests	(Oye <i>et al.</i> , 2012)	Build upon related literature and confirmation
				(Luo & Dani, 2015)	Confirmation
				(Chamberlin & Lehmann, 2011)	Build upon related literature and confirmation

6.11 Social presence and Twitter

This section explores the explanations of the possibilities of building social presence *via* Twitter and how that may be achieved. The argument is based on the questionnaire responses along with interview data. It should be noted that the idea of evaluating social presence seems somewhat nebulous, as there are a number of frameworks that have been proposed (Lomicka & Lord, 2012). In the current study, the evaluation of social presence follows Garrison's (2003) frameworks and definition, which were presented in the literature review. In other words, the obtained data will be associated, explained and reflected upon *via* social presence definitions and its three key elements (interpersonal, open and cohesive communication). This study believes in the importance of social presence in terms of learning; indeed, this importance is also highlighted in the literature review. Within the online learning environment, the possibility of having Twitter integrated successfully requires identifying challenges in the traditional classroom setting along with the ability of instructors rather than the usage of technology alone. The effectiveness of Twitter in the educational discipline may also depend on the course content, the assignment task, and the instructor and students' expectations of the platform (Preston *et al.*, 2015). Social presence is viewed as the ways that users are able to represent themselves in an online community (Dunlap & Lowenthal, 2009). The current study revealed that learners were able to interact, communicate, ask questions and receive answers, comment, provide feedback, share information, express themselves and confirm understanding in real time. These aspects are important in building any community such as social presence *via* Twitter which can be created both in and out of the classroom, thus, will likely be maintained to accomplish certain objectives. In the classroom, students shift from a physical to a more online social presence for building an online classroom community. Throughout the created community, members are able to identify each other (according to their names or nicknames) along with communicating and working collaboratively towards achieving particular goals in a trusted online environment (working in hashtags or simple under the instructor's tweets). To elaborate, several examples in this regard are included in this context. A participant said, *'we had the opportunities to know each other more'*; this is significant in social presence as it increases the level of trust in an environment. Another interviewee expressed that Twitter *'increases our interaction with each other in the class such as I am able to interact with all students'*, whilst another interviewee stated that *'Twitter encouraged us to participate and interact with each other'*. This is a sign that the community built in Twitter is not limited to particular peers, rather it allows users to interact with all class members to enhance self-discourse, linking with a response *'Twitter is better because I can take my time in responding'*. Further participants stated that *'I like the idea of sharing the information among us'*. Besides the quantitative data which showed that Twitter is a great tool for sharing, this response can be used to emphasise the facilities and reflect participants' feelings in this regard. Another interviewee acknowledged that they were able to *'connect and discuss with friends for learning purposes and talking about the requirement'*. It is believed that the potential for creating social

presence commences by establishing and having the chance to know each other *via* activities that occurred before class and in the classroom. Afterwards, this seems developed by posing questions and receiving answers, sharing information and participating in discussions. Having previously occurred is an indication that interpersonal communication and open communication are likely to be established. Thus, the social presence appears to be established based on the quantitative findings, which are supported by qualitative outcomes. In addition, it was also uncovered that maintaining the connection among students in order to confirm understanding or collaborating towards certain educational aims were accomplished by learners *via* Twitter. For instance, a participant stated, *'We exchange our answers and correct each other either face to face or on Twitter during class time'*. Some interviewees believed that *'Twitter helps us in answering our friends' questions'*. Moreover, another interviewee responded, *'I find it easy to ask when I have questions for my friends'*. Constructive discussion is likely to occur *via* the Twitter community, for instance, a participant stated, *'I search for other students answer and read them; it increases our critical thinking by comparing it with my answer and we can evaluate others' responses'*. This may be a sign that the built community lasts throughout the course; it may also indicate finding prior discussions or answers is not difficult. Based on these results, it may be stated that social presence can be built through Twitter; moreover, the social presence seems established until the goal is met. For instance, during and after a lecture, learners present themselves more online for a certain time in order to fulfil their requirements. Students have 'the ability of participants to identify with a group, communicate purposefully in a trusting environment, and develop personal and affective relationships progressively by the way of protecting their individual personalities' (Garrison, 2011, p. 23). These results are consistent with other studies conducted by Lomicka and Lord (2012) who found that Twitter is a tool that enables students to generate social presence and build a community, with social presence clearly presented in the students' tweets. Similarly, recent research by Solmaz (2016) demonstrated that social presence was clearly presented in focal students' tweets. Twitter was also proved to enhance a positive social presence through synchronous in-real-time nature (Dunlap & Lowenthal, 2009). Further support is that social media has a strong feature in building valuable relationships among students within the course since students are able to access and overcome relationship barriers (Schroeder *et al.*, 2010). Preceding authors Schroeder *et al.* (2010) supported this claim by providing an example within Nottingham Trent University, particularly, where the utilisation of blogs assisted learners to offer each other social support on teacher training programs. To summarise, the current results together with published literature suggest that Twitter perhaps is a tool that needs to be considered for building a social presence. Hence, having developed online learning communities lead to an increase in the effectiveness of learning. According to Lomicka and Lord (2012), the development of a community, both in and beyond the classroom, is a fundamental aspect for having an effective educational process.

Table 6.7: Discussion summary: social presence

Section	Source of data		Summary points of findings	Related studies	Nature of contribution
	Questionnaire	Interview			
Social presence	√	√	Social presence can be built through Twitter	Lomicka and Lord (2012)	Build upon related literature
				by Solmaz (2016)	Build upon related literature
				(Dunlap & Lowenthal, 2009)	Build upon related literature

6.13 A brief overview linking learning on/with Twitter to learning theories

This section attempts to link the research's findings with learning theories. The aim here is to further explain the findings in terms of existing theories, which leads to strengthening the current outcomes. It should be noted that this section depends highly on the findings of previous sections. Having this section independently rather than including these theories within each previous section/subsection helps avoid repetition due to the fact that these theories can be applied to explain the results in more than a single section. In this regard, applying learning theories leads to explaining and expanding upon the outcomes of the research in depth rather than simply validating or contradicting applied theories.

As far as learning is concerned, there are various disciplines that have defined learning from their own perspectives. In this study, the expression will be carried out by psychological viewpoints. Learning is a social activity that develops in a social place and encompasses social interaction (Vygotsky, 1978). As such, these theories emphasise the importance of social interaction. This importance may be considered as a reason for some educators to integrate social media tools such as Twitter into the learning setting (Dhir *et al.*, 2013). In order to evaluate the effectiveness of Twitter in the learning environment, learning theories are applied to express these tools in relation to the learning process. In this investigation, the majority of participants agreed to the questionnaire's items along with positive qualitative results which provided confident results related to social learning. It can be said that sharing information and peers' ideas can be approached socially *via* Twitter, therefore, they are able to learn about their classroom members' opinions as well as share their thoughts in a social environment. In addition, participants emphasised the effectiveness of Twitter in their communication, interactions and dissemination, showing that students have the possibilities to socially interact and communicate, ask questions and receive answers, and share information *via* Twitter. According to the Social Development Theory developed by Vygotsky (1962), learning is inherently a social activity that takes place through social interaction. He also posits that social interaction precedes development. Based on that, learning is potentially likely to occur as a result of social interaction *via* Twitter. Additionally, Vygotsky (1978) also believed that social interaction is essential in the development of knowledge. It is expected that the topic-related interactions through this tool (context based) was mainly for educational and learning goals. Accordingly, this can be linked to the belief that "Learning takes place in a social context through interaction with other students, instructors and the other designers" (Kurt, 2011, p. 3986). Referring to existing literature and the current study, it was found that Twitter is a tool that enhances social interaction and learning between users (among students themselves and between student and instructors) by facilitating debate in relation to studied courses (Rinaldo *et al.*, 2011). Furthermore, social media is a virtual environment where users can provide educational supports within built communities around the program, and it is

also a place for fulfilling educational inquiries either by obtaining answers directly from users or locating the information on shared communities. Learners are able to tweet their understanding through Twitter to their peers, therefore, in case of tweeting incorrect information or asking additional support, there are opportunities for more advanced peers to correct and add additional information. This opportunity is associated with the 'more knowledgeable other' (MKO) in social development theories (Vygotsky, 1978). Regarding Twitter and learning, contact with an MKO may be attained easily when Twitter is implemented. An example is tweeting to MKOs who can be peers, instructors, or any Twitter users in order to gain information. This was highlighted during the interview procedure, as students were able to evaluate other tweets or ask their friends for support. Hence, introducing support *via* Twitter from MKOs assists students to learn faster. This contributes to the zone of proximal development (ZPD). In ZPD, there are some skills which are extremely difficult for learners to master on their own, however, these difficulties can be overcome with the guidance of a more knowledgeable person (Vygotsky, 1978). Learners agreed that Twitter is a place wherein support can be provided from or to others; questions and answers which appear at the top Twitter activities is an example of this support. In this context, based on quantitative and qualitative data, supports are exchangeable among students in relation to the educational project. Thus, it could be concluded that based on the perspective of Social Development Theory, integrating Twitter appropriately and correctly into the learning environment appears to increase the possibility of social learning as a result of interaction, sharing, Q&A and communication affordance. In this regard, Churcher's (2014) conclusion should be highlighted, namely that it is unexpected to assume students will directly embrace and apply social media for critical discussion wherein banal chatter is common practice. Thus, the instructor needs to provide an example or require an assignment until students become more confident in utilising social media for practical educational use.

In relation to social constructivism, involving others in discussion and having opportunities to see and comment on other tweets leads to the concept that "Constructing meaning comes from interacting with others to explain, defend, discuss, and assess our ideas and challenge, question, and comprehend the ideas of others" (Sherman & Kurshan, 2005, p. 12). The reason for considering social constructivism rather than other forms of constructivism is that this form is unique, as social constructivism emphasises the way that social interaction influences the process of constructing and gaining knowledge.

Social media is a good medium for actively engaging students. Through Twitter, users are able to construct meaning from reflecting and participating. The results showed students agreeing to the items presented to them, which can indicate students found social learning *via* Twitter more effective and easier than traditional methods of teaching. In addition, the support they received enabled them to reflect on and read available tweets and information, thus, assessing themselves and others. This could indicate the construction of knowledge. In correlation with an earlier

suggestion, students are able to construct knowledge through social media as a result of participating in debates, re-expressing the materials to be mastered, posing questions and receiving answers rather than simply obtaining and repeating content (Tay & Allen, 2011). Learning this way leads to deeper understanding compared to being alone (Greeno, Collins, & Resnick, 1996). Furthermore, dissemination also contributes to social constructivism, namely the idea that learners could have the opportunity to criticise, collaborate, and co-construct knowledge. In other words, the process of sharing and exchanging learners' perspectives is defined as 'collaborative elaboration' (Van Meter & Stevens, 2000, p.123). This leads to building higher understanding with each other which might be impossible to build individually (Greeno *et al.*, 1996). The results are complementary to the idea that technologies are widely seen as a way of allowing a novel approach to constructivism. This can be in both ways – allowing the learners to take control of their own learning and enriching the social dimension of learning (Conole & Alevizou, 2010, p. 14). By applying social media including Twitter, the main sources for information are not only the instructors; individuals can post information that is related to the educational topic. Thus, social learning networks can include instructors, friends, and other people who participate in a related topic. This sort of disseminated knowledge may also contain recorded lectures or presentations (Prestridge, 2014), thus, allowing opportunities for others who are out of the class to either participate in knowledge sharing or become aware of the lessons taught.

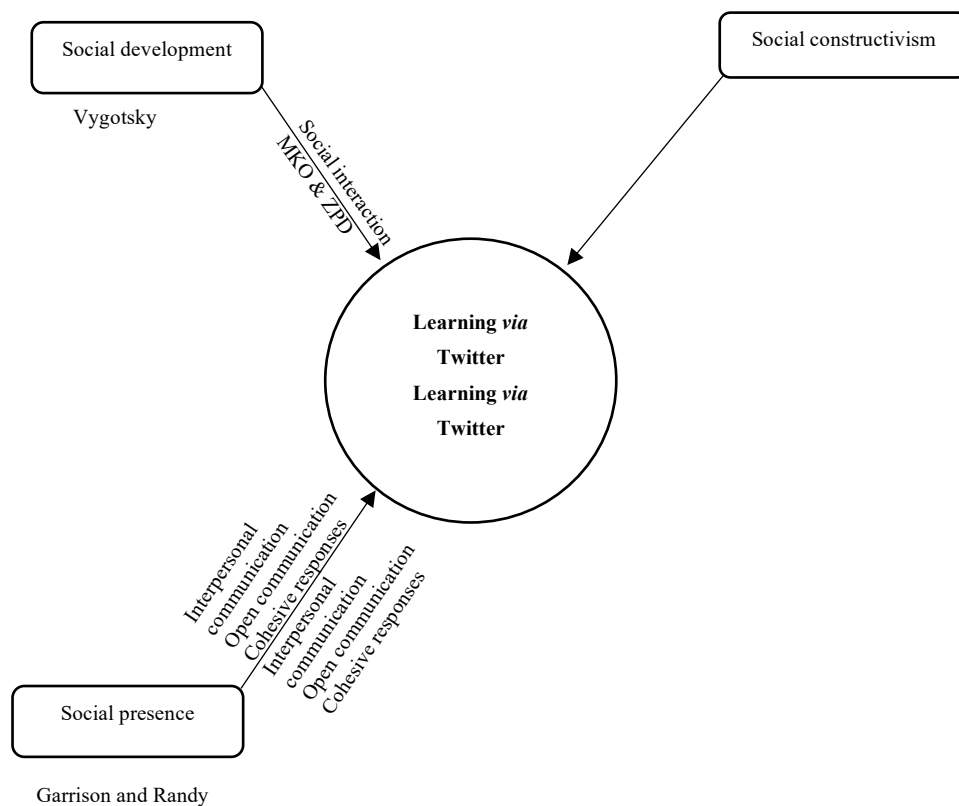


Figure 6.1: Related theories

Further explanation related to constructivism, ‘social interaction stimulates elaboration of conceptual knowledge’, through the collaborative learning environment, learners work towards verbalising their understanding (Van Boxtel, Van der Linden, & Kanselaar, 2000, p. 313). Involving in a discussion with other knowledge appears more elaborate due to the fact that communication means an individual wants to be understood by others, so a more coherent explanation is approached. Thus, it can be concluded that collaborative learning has the possibility to engage learners in activities which are fundamental in the process of concept learning. In contrast, having high-quality collaborative learning may not always approach because learners can be characterised as competitive and focused on completing the task rather than understanding the concept (Van Boxtel *et al.*, 2000).

This section has determined that social learning can be achieved through the integration of social media such as Twitter. Students are able to gain support, work collaboratively towards educational goals and construct knowledge. Nevertheless, a social-media-based approach in relation to learning can be limited by its affordance. Applying social learning theories may show that the capability of a social-media-based approach to learning can be limited to such activities and theories. In this case, incorporating social media into learning appears to alter learning approaches in some cases to social. Thus, educators who attempt to integrate social media into the learning environment need to amend and create challenges in the selected environment. For instance, they need to encourage students to work together more than individually whilst also setting a plan and monitoring the virtual environment. Students are also required to concentrate on gaining understanding from discourses rather than finishing the tasks.

Chapter 7: Conclusion and recommendations

7.1 Introduction

The previous chapter discussed existing literature in depth along with the current research's findings which were gathered from questionnaires and interviews. This chapter aims to summarise and draw conclusions regarding research questions, pointing out to what extent they address the research objectives and associate the current findings with the literature review. This chapter also evaluates the study's contribution to the body of knowledge, reports the limitations, and provides suggestions for future research. In addition, practical recommendations in order to increase the effectiveness of social media in a learning environment are provided. Fundamentally, the organisation in this chapter follows the outline of the previous chapter (discussion). Therefore, the current section presents the primary findings according to each research question. These questions are aiming to address the research topic '*to what extent do university students in Saudi Arabia find social media tools (Twitter) useful in their respective learning environments?*'.

7.2 Research objectives

The research aimed to explore the usefulness of social media (Twitter) in university students' learning environment in Saudi Arabia. An investigation of students' perceptions towards the integration of social media in their learning setting has been closely examined to achieve the following objectives:

- Provide detailed information focusing on the challenges which students experience during the integration of social media (Twitter) in the learning setting. This information is reported in order to assess both beneficial and detrimental aspects regarding participants' responses, as well as how the Twitter tool is being utilised in a learning environment.
- Determine the obstacles facing students through the integration of social media (Twitter) in their learning practice.
- Determine the disadvantages of Twitter that students encounter through the integration of this platform in a learning environment.
- Provide detailed information regarding Twitter's positive capacity in students' learning practice.
- Provide detailed information exploring students' engagement through social media for educational purposes.
- Provide detailed information focusing on the possibility of Twitter offering a pedagogical potential in their learning environment

7.3 Research questions

- To what extent do students find challenges of integrating Twitter in a learning environment beneficial/detrimental and how?
- What are the perceived obstacles to integrating social media (Twitter) in educational disciplines?
- What are the perceived disadvantages of integrating Twitter into educational disciplines?
- To what extent do students believe that using Twitter has a positive capacity in their learning environment?
- To what extent do students engage *via* social media (Twitter) for educationally relevant purposes?
- To what extent do students believe social media (Twitter) offers pedagogical potential in their learning environment?

7.4 Research findings according to objectives

7.4.1 First research question

This section addresses the question ‘*to what extent do students find challenges of integrating Twitter in a learning environment beneficial/detrimental and how?*’. This question was addressed through the first dimension, wherein the data was derived from responses to questionnaires and in interviews. This question is divided into sub-questions/categories for determining the challenges more precisely. These sub-questions/categories will be presented below along with their key findings.

7.4.1.1 To what extent do students find Twitter a useful tool for educational activities in terms of before, during and beyond the class, and for each of these how they find it useful?

Students reported positive results towards the use of Twitter in their learning environment in relation to the place of activities. These outcomes will be summarised according to three selected areas, namely before, during and beyond the class.

Before the class

Twitter helped learners to prepare activities prior to face-to-face gatherings. Reminding each other about upcoming tasks was accomplished by students in this stage. Nonetheless, this does not mean that activities are limited to this technique or activities, a further benefit obtained from this procedure is that having learners prepared before coming to the actual class is important to strengthen and establish a relationship among members, particularly at the beginning of the semester.

During the class

Twitter is an effective tool that can be integrated into the classroom. It is a convenient and easy tool to use in a classroom discussion along with its possibility for improving the quality of the course. Students are able to support their discussion of the educational topics by including pictures and videos in their tweets. During lectures, applying hashtags is preferred by students as it organises classroom discussions.

Integrating Twitter into the classroom creates an active environment, thus, changes the traditional classroom layout. Moreover, unlike traditional tools such as pen and paper, the availability of tweets and information generated during the class benefit learners in a way that it allows users to access these at any time using any device rather than sticking to a particular device or tool, with the participants also being able to navigate certain information. In addition, Twitter is recognised as a place where learners return for more information or to seek important materials such as key lecture points during exam days. As a result, incorporating Twitter into learning disciplines may result in stimulating the classroom setting rather than sticking to a traditional layout.

Beyond the class

Twitter smoothly expands what is occurring inside the classroom to outside the classroom. This is essential in the way that it provides more time for ongoing discussions rather than being limited to lecture periods, and it also allows members to establish a new discussion after completing the session. Furthermore, Twitter might serve absent students as they are able to see and participate in a synchronic method while they are away.

Based on the above results, undergraduates indicated that they believe using social media (Twitter) is an effective tool that allows them to usefully approach and undertake desired activities regarding their learning areas, as learners had opportunities to complete and stay in touch with their classmates regardless of where they are. Therefore, integrating social media has possibilities to expand and sustain learning communities along with providing students more time to learn with each other, rather than being limited to scheduled lectures, certain areas or times. However, such opportunities need monitoring, motivating, and great induction on how these tools can be

used in the learning environment in order to increase the benefits and reduce the level of confusion.

7.4.1.2 To what extent do students find Twitter a useful tool for educational dissemination?

Students reported positive views about the use of Twitter in sharing information, stating that Twitter enhanced knowledge sharing for students. This increases the prospect that students are able to criticise themselves and expound their knowledge (Twitter as an information source) due to the fact that learners compare their own knowledge with posted/tweeted information. A further benefit is that the dissemination feature leads to information reaching more members in different classes, as users can utilise the Twitter search function for seeking available information. Additional features are that students can return to organised shared information, materials and discussion threads at any time to confirm their understanding and revise studied topics in case of absence. Thus, undergraduates found Twitter is a wonderful tool for sharing knowledge and increasing their communities' members which results in having more information. Furthermore, sharing related information, material and other resources benefit students because they do not rely on a single source of information (textbooks or instructors) as the shared information cannot be limited to a single textbook or an instructor (more perspectives can be delivered).

7.4.1.3 To what extent do students find Twitter a useful tool for educational communication?

The undergraduates reported positive views about the use of Twitter for educational communication, stating that social media is a tool that students practice for connecting with other learners or their instructors in order to establish a communicating environment. Students feel that applying Twitter results in establishing more connections among learners and between students and lecturers. Communication for learning purposes *via* Twitter is recognised by students as an easy method to approach more members, which may produce a variety of responses. Twitter overcomes the difficulty of meeting physically, enabling communication with all class members beyond the educational institution. This is not limited to academic goals as it extends to more personal purposes such as seeking permission for non-attendance. Thus, Twitter can be considered as a useful and easy means to supplement students' communication during study periods and building communities.

7.4.1.4 To what extent do students find Twitter a useful tool for educational interactions and collaboration?

The university students responded positively towards the use of Twitter for educational interaction and collaboration, expressing that their interaction and collaboration were boosted and improved through the use of Twitter both in and out of the classroom. The key finding during the Twitter integration regarding interaction and collaboration is that students' interactions are not limited to the peers who sit next to them, but they can also interact and collaborate with all members in the class or even with other members in different classes. In addition, students found Twitter as a place to learn collaboratively as they are able to work to gather and correct the wrong answers for each other. Hence, applying Twitter appears to be an ideal tool for improving learners' interaction and collaboration. Fundamentally, such a facility provides learners more time to work with each other rather than limited collaboration to lecture periods.

7.4.1.5 To what extent do students find Twitter a useful tool for asking and answering educational inquiries?

University students revealed positive outcomes toward the use of Twitter for asking and answering educational inquiries, indicating that questioning and answering *via* Twitter was helpful, enjoyable and easy to approach. The result also indicated that learners did not only tweet a number of questions, but they enjoyed using Twitter during lectures for this purpose.

Even though Twitter is an open platform for a wide number of users (class and non-class members), questioning and answering related to educational inquiries were limited to class members only. Fundamentally, an absent student can use Twitter for inquiring about course required tasks.

7.4.1.6 To what extent do students find Twitter a useful tool for understating educational topics?

Students reported positive views about the use of Twitter in improving their understanding, stating that Twitter helped them to reach a deeper understanding of an educational topic. The increase of understanding appears through looking at others' participation and correcting their own perspectives. Moreover, allowing more time to respond to and discuss educational topics enhance learners' knowledge with the richness of tweets wherein students can add extra material and look at related photos and videos leading to deeper understanding.

7.4.1.7 How are students' thoughts shaped after experiencing Twitter for learning are beneficial/detrimental ?

Students reported a positive feeling towards the use of Twitter for learning, stating that their thoughts about using Twitter for educational purposes changed after practising Twitter in a learning environment. The change in students' feelings may be due to the fact that students learnt through applying Twitter regardless of their initial thoughts, indicating the potential of this platform in learning aspects. This is important as it perhaps reflects some users' perceptions of social media being a platform designed for social and entertaining purposes rather than only considering them for learning support.

7.4.1.8 To what extent do students find Twitter a useful tool for learning *via* Twitter?

Even though the prior results contribute to an understanding of improving students' learning, it seems valuable to report students' perspectives in this regard. University students revealed positive views toward the use of Twitter for learning, indicating that the platform makes learning easier and that studying *via* Twitter allows students to learn materials more effectively. Exchanging ideas and opinions among each other, being involved in discussions and reading extra materials such as rich media in a single tweet leads to enhanced possibilities of learning. In addition, the availabilities of tweets and collaboration with other members lead to increased self-assessment or asking more details about the other tweets from the author when needed. Not only that but evaluating and providing feedback to other students also enhances their process of learning in relation to educational topics.

To conclude, in response to the first question, '*to what extent do students find challenges of integrating Twitter in a learning environment beneficial/detrimental and how?*', the undergraduate students reported optimistic outcomes toward the use of this platform in their learning, expressing that dealing with Twitter can facilitate and improve the approaching activities, sharing knowledge, communication, interaction and collaboration, questions and answers, understanding and learning among students and help in enhancing their self-confidence and self-assessments. It also increases diversity in modern teaching methods and changes the traditional class layout. Thus, students practice these challenges positively.

7.4.2 Second research question

This section addresses the question '*What are the perceived obstacles to integrating social media (Twitter) in educational disciplines?*' This question was addressed through the second dimension wherein the data originated based on the responses of questionnaires and interviews, assessing several aspects of barriers which will be summarised below. This section will only summarise obstacles or the potential ones according to student perspectives.

According to the data, students did not identify any particular obstacles facing them during the integration of Twitter into their learning environment. However, there are some concerns related to selected barriers. In terms of open and public tools (less privacy), learners did not view that as a major barrier, evidenced by the large number of participant responses. However, interviews revealed that students prefer to practise a private tool that is limited to the classroom's environment in terms of learning and communicating for educational purposes. This may be because some would not favour mixing social aspects with academia; moreover, the level of mixture among learners is various. Further reasons may be related to those who separate social and academic accounts. In addition, the hashtag function appears to be a great method in dividing education threads, topics or discussions from other social ones. This is also ideal in reducing unrelated tweets from popping up, therefore, users are also less distracted. Further explanation can be seen in that students are less likely to share inappropriate tweets when they know these will be seen by academics.

The majority of participants did not report non-academic interaction as a barrier. Nevertheless, interview data exposed that some students could check others' tweets which were not related to their study during lectures. This was reported by a few students who might have completed their required tasks and then waited for other peers to complete their work. A further possible obstacle is related to accessing Twitter and the internet, as there may be issues with internet access, devices, or failing to log into the Twitter account. However, these issues are more likely to be recognised as general technology drawbacks rather than drawbacks which are related to social media only.

To conclude, introducing social media into the classroom should be monitored and encouraged by instructors for the utilisation of academic purposes. Since these tools are not specifically produced for academic purposes, users may not correctly apply them in academic areas unless they were interested, encouraged or provided with a potential procedure. Like any other technological tool, Twitter could divert users' focus as they need to log on and follow participatory activities. Even though irrelevant tweets may pop up and direct users to non-academic purposes, Twitter seems to have less distraction as the notifications can be turned off and therefore be beneficial if applied correctly. Additionally, using hashtags is a remarkable

feature in Twitter because it groups all relevant tweets under a certain topic. This may be seen as a method that reduces non-academic interaction.

7.4.3 Third research question

This section addresses the question '*What are the perceived disadvantages of integrating Twitter into educational disciplines?*'. This question was addressed through the fifth dimension, wherein the data was originated based on the responses of questionnaires only, as no data was revealed in interviews. These results are summarised below.

Students did not report a negative practice towards the use of Twitter for learning, indicating that Twitter is more likely to be suitable for the learning environment. According to the responses, Twitter was not a distraction tool; learners were able to participate appropriately showing that the use of this tool for learning is not confusing. Highlighting the methods that users (instructors and students) apply and how they utilise this tool is seen as the main aspect for boosting or reducing the success of Twitter incorporation.

7.4.4 Fourth research question

This section addresses the question '*To what extent do students perceive that using Twitter has a positive capacity in their learning environment?*'. This question was addressed through the fourth dimension, wherein the data was originated based on the responses of questionnaires and interview. These results are summarised below.

University students revealed positive outcomes toward the use of Twitter for learning, stating that this platform facilitated sharing information (ideas, key notes, pictures and extra educational resources) related to educational topics in both aspects among classroom members and between different classes who studied the same subject. Twitter also appears to aid communication among class members for educational goals and the requirements in a motivating and encouraging way. Interestingly, interviews revealed that students communicate through the classroom's hashtags, which is essential for building communities rather than communicating individually *via* private messages. Students admitted that Twitter motivates them to ask questions – this motivational environment that allows learners to easily ask questions can be seen in two facets: one could be related to shyness and the other might be related to how their questions were answered (simple and direct). Social media including Twitter has the potential to assist learners to achieve their educational goals in a way which is meaningful to them. Referring back to the potential of Twitter in learning settings, educational goals are varied and include asking questions, receiving answers,

engaging with activities, being motivated to learn, being productive, communicating with others for learning purposes and extending the learning landscape beyond classrooms and institutions.

7.4.5 Fifth research question

This section is responsible for providing a summary answer related to the question '*To what extent do students engage via social media (Twitter) for educationally relevant purposes?*'. This question was answered by obtaining data from questionnaires only.

The analysis of related data revealed that Twitter is a supportive tool that '*often*' increases students' engagement in educational aspects, such as being involved in discussions and asking questions related to educational topics. However, students are '*sometimes*' involved in a discussion with an instructor in relation to their grades and assignments. Similarly, learners '*sometimes*' participated in academic activities which are non-coursework activities, along with being involving in discussion with others who are not their instructors and class members.

7.4.6 Sixth research question

This section provides a summary answer related to the question '*To what extent do students believe social media (Twitter) offers pedagogical potential in their learning environment?*'. This question was answered by obtaining data from questionnaires and interviews.

The analysis of data revealed that Twitter is a supportive tool which allows students to share their academic interests with others. This is a great feature in building educational communities based on their academic interests including further extending educational topics of interest such as learning the English language. In addition, Twitter was a supportive tool in expressing individualities and creativity, emphasising that applying Twitter enabled learners to think comprehensively as they have more time to think about the course requirement. This is also significant as it provides learners with confidence in responding and it decreases shyness for some students. In this case, according to responses, students are not only expressing themselves, but they can also hold the discussion around their interest and build their own communities.

7.4.7 Theoretical perspectives

7.4.7.1 Social presence

The current study finds that Twitter is an ideal tool for learners to build social presence wherein they can represent themselves in an online community. Through this community, participants are able to identify each other, communicate, collaborate and express themselves in a trusted online environment. Aside from this, their relationships are likely to strengthen within the course due to the fact that learners are able to provide support and overcome relation barriers such as time and place.

7.4.7.2 Learning theories

7.4.7.2.1 Social development

In terms of social development perspectives, in the current investigation, the majority of participants agreed to the questionnaire's items which provided positive results related to important aspects in social learning such as interaction and communication for learning purposes. In addition, through qualitative results, participants emphasised the effectiveness of Twitter in their communication, interaction, collaboration and dissemination. This showed that students can socially interact and communicate, ask questions and receive answers, and share information *via* Twitter for educational and learning goals. Associating with existing literature, Twitter is a tool that enhances social interaction and learning between users (students and instructors) by facilitating debates in relation to studied courses (Rinaldo *et al.*, 2011).

In addition, social media is a virtual environment for users to provide educational support within built communities around the program and is also a place for fulfilling educational inquiries either by obtaining answers directly from peers or locating the information on shared communities. This opportunity is associated with the 'more knowledgeable other' (MKO) in social development theories (Vygotsky, 1978). Regarding Twitter and learning, contact with an MKO may be attained easily when Twitter is implemented. An example is tweeting to MKOs who can be peers, instructors, or any other Twitter user in order to gain information. This was highlighted during the interview procedure as students were able to find out about their inquiries or ask their friends. Hence, introducing support *via* Twitter from MKO assists students to learn faster, contributing to the zone of proximal development (ZPD). In ZPD there are some skills which are too difficult for learners to master on their own, however, these difficulties can be overcome with the guidance of a more knowledgeable person (Vygotsky, 1978).

Generally, learners agreed that Twitter is a place where support can be provided from or to others *via* questions and answers which appear on top of Twitter activities. The current context relying on quantitative and qualitative data revealed that support is exchangeable among students in

relation to the educational project. Thus, it could be concluded that in relation to the perspective of Social Development Theory, integrating Twitter appropriately and correctly into the learning environment appears to increase the possibility of social learning as a result of interaction, sharing, Q&A and communication affordance.

7.4.7.2.2 Social constructivism

Involving with others in discussion and having opportunities to see and comment on other tweets leads to the concept that “Constructing meaning comes from interacting with others to explain, defend, discuss, and assess our ideas and challenge, question, and comprehend the ideas of others” (Sherman & Kurshan, 2005, p. 12). Given this, social media is an ideal medium for actively engaging students. Through Twitter, users are able to construct meaning from reflecting and participating. The results showed students agreeing to the items presented to them, which can indicate that students found social learning *via* Twitter more effective and easier than traditional methods of teaching. In addition to the support they received, they were able to reflect, read available tweets and information, and assess themselves and others. This could indicate the construction of knowledge. In correlation with an earlier suggestion, students are able to construct knowledge through social media as a result of participating in debates, re-expressing the materials to be mastered, posting questions and receiving answers rather than simply obtaining and repeating content (Tay & Allen, 2011). Learning this way leads to deeper understanding compared to being alone (Greeno *et al.*, 1996). Linking with dissemination, which also contributes to social constructivism, is the idea that learners could have the opportunity to criticise, collaborate, and co-construct knowledge. In other words, the process of sharing and exchanging learners’ perspectives is defined as ‘collaborative elaboration’ by Van Meter and Stevens (2000, 123). This leads to building a higher understanding with each other, which might be impossible to build individually (Greeno *et al.*, 1996).

This section has determined that social online learning can be achieved through the integration of social media such as Twitter. Students are able to socially interact and gain support along with their ability to construct knowledge. Nevertheless, the possibility of learning through social media can be limited by its affordance. Applying social learning theories may show that the capability of social media related to learning can be limited to such activities and theories. In this case, incorporating social media into learning appears to alter learning traditional approaches (passive learners) in some classes to social and active. Thus, educators who attempt to integrate social media into the learning environment need to amend and create challenges in the selected environment. For instance, they need to encourage students to work together more than individually, whilst also setting a plan and monitoring the virtual environment.

7.5 Critical approach

7.5.1 Evaluation of the study

The previous objective was addressed through the use of a mixed-methods approach, namely applying questionnaires and interviews. In terms of questionnaires, even though the majority of participants agreed/strongly agreed positively regarding the challenges, there were a few participants who disagreed/strongly disagreed. This minority of students indicate that instructors need to be aware of students' acceptance during the integration of social media into a learning setting and provide additional support to those particular students. This rejection/negative response can be related to adopting another social media tool for students who prefer to use apps such as WhatsApp for learning more than Twitter.

It must be noted that the current study relies on students' perceptions *via* self-reported data as the main source of information. This may limit the researcher's perception in this regard.

7.5.2 Strengths of study

The current thesis derives its strengths from a different number of aspects. Improving learning and educational benefits are important targets of the majority of institutions, and considering the advantages of social media for enhancing learning appears to be an important step in several universities. Recognising the benefits of social media are in their infancy in Saudi Arabian universities because the Ministry of Education is currently undertaking enhancement procedures in order to develop students' learning and educators' teaching methods, targeting all levels of education. Additionally, it is recognised that a key objective of the Ministry of Education in Saudi Arabia is 'optimally employing information, and Telecommunication technologies' (Ministry of Education, 2018a, p.1). One strength of the study can be seen in providing a solid result in relation to social media in education and its possibilities for developing learning and enhancing students' participation. Although some research has been conducted in Saudi Arabia in this field, previous studies did not critically approach the topic by asking students about their attitudes in relation to the benefits of social media in their learning without actual implementation (Twitter in the learning environment), except for some research which had a different focus or was linked with the current study for the purpose of extension and confirmation.

Furthermore, the current study relies on a mixed-methods approach for obtaining more comprehensive data in order to address research objectives. The source of the secondary data in the existing literature shows that the present study is already part of and linked to a related field of knowledge.

The main research instrument was constructed according to existing literature so builds on what is already known within the field and allows others to build on this research.

In terms of analysing the data, ‘exploratory factor analysis’ was used to strengthen the knowledge claims in terms of understanding the reliability of the patterns of responses from participants.

The research findings were associated with related learning theories in order to understand the data and link the outcomes with the learning potential that might occur during practical use from a theoretical perspective.

The study broadly corresponds with the existing literature, and extends what is known from other research in terms of what are perceived as obstacles.

This research is important in reflecting on students’ perceptions in relation to integrating Twitter into the learning environment, particularly in Saudi Arabia, as the results corresponded with other literature.

7.5.3 Thesis implications and contributions

While some prior research has been conducted to investigate social media in the learning environment in a western context, there is a lack of empirical studies investigating social media in the learning environment in eastern context. The current findings contribute to the existing literature along with developing the understanding of integrating social media into the learning environment in a related context. Furthermore, this investigation appears as a foundation to further studies in the field and provides possibilities for akin investigations to be carried out.

In light of this, the current research has contributed to theories and practice relating to the integration of social media in learning environments along with some consideration related to methodological contribution.

7.5.3.1 Empirical

The findings of the current research contribute to the field of knowledge in that the integration of Twitter into the learning environment has remarkable benefits in leaning aspects. Twitter was identified as a powerful tool which can be successfully integrating into formal classes along with it is potential in smoothly expanding and maintaining learning beyond the institutional building. The key findings suggested that Twitter is an ideal tool for sharing with more than classroom members, which was reported by students as a wonderful way of developing their knowledge. This finding has rarely been reported in the existing literature.

In addition, the current research contributes to the body of knowledge that Twitter is a remarkable means for communication, interaction, collaboration, asking and answering, engagement and enhancing understating of educational topics. Furthermore, the findings contribute to the field of knowledge that Twitter itself has a positive capacity and potential in learning as a pedagogical tool. Therefore, these findings indicated the possible contribution by firstly addressing gaps in the literature which were identified earlier in [the literature review chapter](#).

7.5.3.2 Theories

The findings also generally contribute to the possibilities of establishing social presence during learning *via* Twitter based on students' perceptions.

Furthermore, the findings contribute to social learning in that students are able to socially interact, communicate and seek assistance in order to support their educational goals. These findings also appear to be consistent with the concepts of More Knowledgeable Other (MKO) and the Zone of Proximal Development (ZPD) in social development theory as learners are able to find MKO easily, helping them learn faster.

The current study also appears to contribute to the notion that meaning occurs through interaction, re-expressing the materials and participating with others through posting tweets wherein collaborative elaboration is likely to occur.

To summarise, the current study contributes to the existing litterateur which found Twitter is a powerful tool in learning.

7.5.3.3 Practical recommendations

Social media is an ideal tool that serves both students and instructors. This section provides some key recommendations that need to be considered during the implementation. These recommendations are tentative as the study sought to understand patterns of responses about Twitter, using participants reports of their use and experience. According to the current study, there are no significant differences between those who had prior online academic experience and those who had none. In addition, there are no significant differences between students who had academic Twitter experience and those who had none. These can be seen as a positive impact of Twitter as a pedagogical tool because lecturers are less likely to be worried about students' previous experiences. However, differences were found in the frequency items. For instance, students who use Twitter more than five times a day are significantly different from those who

rarely use Twitter (see Table 4.23). This suggests there is a level of fluency or confidence in use which may affect learners and how they integrate Twitter into their studies.

In order to have effective adoption of social media, particularly Twitter, in the learning environment, further recommendations are derived from exploring the literature review and understanding the current findings. Thus, the following points provide a general adoption recommendation:

- Planning the adoption of Twitter in advance
- Clearly defining the adoption goals and the required tasks
- Ensuring the availability of infrastructures such as internet access and availability devices
- Providing a clear introduction regarding how these tools can be used for learning purposes and adopting particular procedures so losing existing tweets and confusing in responding can be minimised
- Opening more than one account is recommended for those who are worried about their general tweets
- Encouraging students to participate and involve in online communities.
- Instructors need to be part of online communities
- Learners should be encouraged to work collaboratively in both setting (face-to-face and online)

7.6 Limitations of the study

The study has a main limitation related to gender as it focuses on male participants only. This is due to the segregated nature of education in Saudi Arabia.

The sample of the study is specific to Saudi Arabia, which may limit any generalisation of the findings to different cultures and geographical areas.

The study relies on questionnaires and interviews for collecting main data. This therefore relies on self-reported data and participants perspectives.

The analysis is slanted more towards quantitative data with qualitative analysis used for validation.

The findings are limited to those who practised Twitter in their learning and did not attempt to seek the views of those who chose not to use this medium.

7.7 Suggestions for future research

Applying the study or a similar study with a different research sample such as females only or both males and females would make it easier to generalise and be validated.

The study did not include instructors' perspectives. Further research may focus on their views.

Applying confirmatory factor analysis to validate the current exploratory factor analysis might be a beneficial approach.

An experimental design could be conducted in order to identify the appropriate method of integration.

Different data collection procedures may be used for further validation, such as tweets content analysis.

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Appendices

Appendix A: Ethical approval/ Durham University



Shaped by the past, creating the future

11 November 2016

Abdullah Almankory
abdullah.z.almankory@durham.ac.uk

Dear Abdullah

To what extent do University Students in Saudi Arabia find Social Media Tools (Twitter) useful in their respective Learning Environments?

I am pleased to inform you that your ethics application for the above research project has been approved by the School of Education Ethics Committee.

May we take this opportunity to wish you good luck with your research.

Yours sincerely,

A handwritten signature in black ink that reads "Nadin Beckmann".

Dr Nadin Beckmann
School of Education Ethics Committee Chair

Leazes Road
Durham, DH1 1TA
Telephone +44 (0)191 334 2000 Fax +44 (0)191 334 8311
www.durham.ac.uk/education

Appendix B: Ethical approval/ Hail University

الرقم: ٢٠١٧/٢٠٢٠
التاريخ: ١٤٣٩/١٢/٢٠
المرفقات:
القيود:

المملكة العربية السعودية
وزارة التعليم
جامعة حائل
Kingdom of Saudi Arabia
Ministry of Education
University of Hail

وكالة الجامعة للدراسات العليا والبحث العلمي
Vice Rector for Graduate Studies & Scientific Research

سعادة المحقق الثقافي السعودي في بريطانيا
سلمه الله

السلام عليكم ورحمة الله وبركاته

تهديكم جامعة حائل تحياتها : وإشارة إلى طلب المبتعث / عبد الله زيد المنقوري
المتضمن القيام برحلة علمية إلى السعودية لمدة (90) يوم وذلك لجمع بيانات بحثه
لدرجة الدكتوراه اعتباراً من 2017/02/05م.

عليه نقيد سعادتكم بالموافقة المبدئية للمبتعث / عبد الله زيد المنقوري المتضمن
القيام برحلة علمية إلى السعودية لمدة (90) يوم وذلك لجمع بيانات بحثه لدرجة
الدكتوراه اعتباراً من 2017/02/05م.

للاحاطة وتقبلوا مساعدتكم وأفر التحية والتقدير ،،،

وكيل الجامعة للدراسات العليا
والبحث العلمي

أ.د. عبد الله بن محمد الدوسري

المملكة العربية السعودية - حائل هاتف : ٠١٦٥٣٥٢٣٠ فاكس : ٠١٦٥٣١٠١٩٢ ص ب ٢٤١٠٠ حائل
Saudi Arabia Hail : 016535230 fax : 01653 10182 Post Box No Hail 2440 Email : gar@uoh.edu.sa

Appendix C: Letter from the Supervisor to the Saudi Cultural Bureau in UK Confirming the Undertaking of the Field Study



8th November 2016

Dear Sir,

I believe that you may be able to offer some help to one of my doctoral students and ask that you kindly consider my request. I am the supervisor for Mr Abdullah Zaid Almankory for his studies at Durham University into "To what extent do University Students in Saudi Arabia find Social Media Tools (Twitter) useful in their respective Learning Environments?"

He intends to conduct the fieldwork for his studies in Saudi Arabia early next year. The period of collecting data will be approximately three months: from 5/2/2017 to 5/5/2017.

I would very much appreciate it if you could help to make this study possible and to facilitate any steps which might be needed to make this happened. His study is potentially valuable to develop more effective use of technology in education by students and it could inform strategic development of more effective approaches in higher education in the Kingdom of Saudi Arabia.

Should you require any further information, please do not hesitate to contact me.

Yours sincerely

A handwritten signature in black ink that reads "S. E. Higgins". The signature is written in a cursive style with a horizontal line underneath the name.

Professor Steven Higgins
School of Education, Durham University
Leazes Road, Durham, DH1 1TA, UK
Tel: 0191 334 8359
s.e.higgins@durham.ac.uk

Appendix D: Questionnaire (English version)

Questionnaire (English version)

The researcher conducting a study entitled (To what extent do University Students in Saudi Arabia find Social Media Tools (Twitter) useful in their respective Learning Environments?). In order to complete the requirements for obtaining a PhD in Technology Enhance Learning from the University of Durham in the UK.

Social media (in this research) refers to the many relatively inexpensive and widely accessible electronic tools that enable anyone to publish and access information, collaborate on a common effort, or build relationships

Twitter (in this research) is a free, real-time microblogging service whereby people respond to the question ‘what’s happening?’ On Twitter, anyone can tweet, retweet, participate in ‘hashtag’ exchanges and respond to either known or unknown people. Users can tweet publicly or directly to specific people by mentioning their accounts.

This questionnaire encompasses six main dimensions.

Dimension 1- Demographic

Dimension 2- Challenges

Dimension 3- Engagement.

Dimension 4- Positive capacity of Twitter

Dimension 5- Pedagogical potential of Twitter in higher education

Dimension 6- Obstacles and disadvantages of Twitter

The researcher has prepared this questionnaire, which includes Initially General Information. In addition to the three main dimensions required to answer the research questions and hopes you will, kindly, fill in the questionnaire by reading it carefully, then choosing the appropriate answer or clicking (✓) in the right place.

All data will be utilized only for research purposes. As there are no questions to identity the participants strict confidentiality is ensured. I would also like to draw it to your attention that your participation in this survey is voluntary and you are free to withdraw at any point. It will not take more than 15 minutes, but it will benefit the researcher.

Thank you very much for your support and your cooperation, and for further queries about the questionnaire please email correspondence to the following address:

Yours Faithfully,

Abdullah Zaid Almankory

School of Education

Durham University

United Kingdom

Email: Abdullah.Z.Almankory@durham.ac.uk

Dimension 1- Demographic data: Please make (√) in the right place.

1. What is your gender?
☐ Male ☐ Female
2. What is your age?
☐ 18-21 ☐ 22-25 ☐ 26-29 ☐ older than 30
3. Have you ever taken any online courses (offered entirely online without face-to-face interactions)?
☐ Yes ☐ No
4. Which year are you in?
☐ First year ☐ Second year ☐ Third year ☐ Fourth Year
5. What is your skill level in using computer programs and applications? Please make (√) in the table rating your skill.

	Very skilled (5)	Skilled (4)	Somehow skilled (3)	Slightly Skilled (2)	Not skilled (1)
E-mail					
Instant messenger					
Web surfing					
Presentation software (PowerPoint)					
Graphics design application (Photoshop)					
Creating web pages					
Learning management system (Blackboard)					
Facebook					
Twitter					
Snapchat					
Instagram					
YouTube					
What's App					

6. Which of the following electronic devices do you own? Click all that apply

- ☐ Personal Desktop Computer
- ☐ Personal Laptop Computer
- ☐ iPad
- ☐ Smart Phone (iPhone, Phone with Android, Blackberry)
- ☐ E-book reader
- ☐ Gaming console (E.g. Xbox)
- ☐ Handheld gaming system (E.g. PSP)
- ☐ Other

7. Generally, how frequently do you use Twitter in your daily life?

- ☐ Never

- ☐ Rarely
- ☐ Once every day
- ☐ Two to three times a day
- ☐ Four to five times a day
- ☐ More than five times a day

8. What do you use Twitter for?

- ☐ Search (ideas, news)
- ☐ Making friends (Social)
- ☐ Culture
- ☐ Entertainment
- ☐ Commercial
- ☐ Educational purposes
- ☐ Others

9. Have you ever been involved in courses that utilized Twitter before this class?

- ☐ Yes ☐ No

10. Please, select the social media app that you have used during this course for communication purposes.

- ☐ WhatsApp
- ☐ Telegram
- ☐ Snapchat
- ☐ Facebook
- ☐ Others

11. During the study of this course what sort of Twitter account have you used?

- ☐ New account for study purpose
- ☐ My personal account
- ☐ Both

12. Have you used Twitter during this course?

- ☐ Yes ☐ No

Dimension 2- Challenges: Please make (√) in the right place

N	Items	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
1	Twitter has helped me to prepare the role I had to play in face-to-face debates.					
2	Using Twitter for classroom discussions is very convenient					
3	Using Twitter has made me feel more comfortable engaging in discussions during class time					
4	Twitter is more effective in the classroom than Blackboard					
5	Using Twitter improves the quality of courses					
6	I feel Twitter should be used more in courses					
7	Twitter improves interaction outside of class lectures					
8	I believe Twitter benefits my social learning network					
9	Twitter promotes knowledge sharing					
10	I feel more connected with my classmates using Twitter					
11	I can contact my instructor more often using Twitter compared to when I did not have access to Twitter					
12	Twitter improves classroom interaction during lectures					
13	Twitter improves interaction outside of class lectures					
14	Twitter has helped me to participate more in debates					
15	Twitter provides collaborative learning opportunities					
16	The questions and answers on Twitter are very helpful					
17	I enjoy using Twitter in the classroom for asking questions during lectures					
18	Twitter helps me to achieve a deeper understanding of the topic under debate					
19	Twitter has helped me understand the argument of other participants of the debate					
20	Twitter is much more useful for the course than I thought it would be					
21	I acquired personal or professional growth after completing the course					
22	Twitter helped me to learn course materials more effectively					
23	Using Twitter makes learning easier					

24. Place a mark next to the functions within Twitter that you found useful.

- ☐ Home page
- ☐ Following a link
- ☐ Photos
- ☐ Comments
- ☐ Videos
- ☐ Music/audio
- ☐ Like/dislike
- ☐ New tweet
- ☐ Retweet
- ☐ Quote
- ☐ Hashtag
- ☐ Trend
- ☐ Instant message
- ☐ Ease to reply
- ☐ Search
- ☐ Others

25. What was the best benefit you saw or received from using Twitter in the course?

.....
.....

Dimension 3- Engagement: Please make (√) in the right place.

N	Items	Very often	Often	Sometime	Rarely	Never
1	How often do you ask questions or participate in class discussion?					
2	How often do you discuss grades or assignments with an instructor <i>via</i> Twitter?					
3	How often do you discuss ideas from your readings or classes with faculty members outside of class?					
4	How often do you discuss ideas from your readings or classes with others outside of class (students, family members, co-workers, etc.)?					
5	How often do you work with faculty members on activities other than coursework (committees, orientation, student life activities, etc.)?					

Dimension 4- Positive capacity of Twitter: Please make (√) in the right place.

N	Items	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
1	Twitter allows me to find and share educational resources.					
2	Twitter allows me to communicate with classmates about course-related topics.					
3	I am encouraged to ask questions via Twitter.					
4	My educational goals are being met.					

Dimension 5- Pedagogical potential of Twitter in higher education: Please make (√) in the right place.

N	Items	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
1	Twitter allows me to share my academic interests.					
2	Twitter allows me to personalise and express individuality and creativity					
3	Twitter allows me to hold forums to discuss academic topics of my interest					

Dimension 6- Obstacles and disadvantages of Twitter: Please make (✓) in the right place.

1. Obstacles

N	Items	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
1	I do not want to share my private social life with my school					
2	Twitter has badly affected my study					
3	Chatting with my friends distracts me from my studies during lectures					
4	I think lack of experience prevents me from using Twitter effectively					
5	The information in Twitter is illogically organised and confusing					
6	There are accessibility issues within Twitter from time to time					
7	I do not have sufficient access to the internet					
8	Using Twitter for the study requires too much of my time					
9	I have a lack of motivation and encouragement from my instructor					
10	I am intimidated by the use of technology					

2. disadvantages of Twitter

N	Items	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
1	Twitter was a distraction to learning in the course.					
2	Twitter inhibited my participation in the debate.					
3	Twitter has not helped me to understand the topic and argument in the debate.					
4	Twitter has caused more confusion than understanding.					

15. In your experience, what are the benefits/disadvantages of using Twitter for your learning and development?

.....

16. Do you have any suggestions/recommendations for using Twitter tool for learning and development?

.....

Thank you very much for completing the questionnaire

Appendix E: Interviews questions (English version)

Challenges

Was Twitter a useful tool in your learning environment, including social learning? How? Why? Example?

How does Twitter assist you in relation to your social learning? Example?

What makes Twitter unique in social learning compared with other aspects, for example, Facebook, pen and paper? How? Example?

What features does Twitter offer? How? Example?

How does Twitter assist your learning with friends? Example?

Does the use of Twitter make you want to use social learning more? If yes, how? Example?

How does Twitter assist your understanding of an educational topic? Example?

Did you use the discussed information as a source for your exam? Example?

Did Twitter work out the way you expected? Are you upset about anything? Did you find anything funny?

How does Twitter connect you to your instructor? Example?

Obstacles

How did Twitter obstruct your studying? Example?

Was Twitter a useful tool in your learning environment, including social learning? How? Why? Example?

Positive capacity

Was Twitter a useful tool in your learning environment, including social learning? How? Why? Example?

How does Twitter assist you in relation to your social learning? Example?

Positive capacity


Was Twitter a useful tool in your learning environment, including social learning? How? Why? Example?

Personalisation

Did the discussion on Twitter differ from discussion in class? How?

Was Twitter a useful tool in your learning environment, including social learning? How? Why? Example?

Appendix F: Some examples of learning tweets



هنا عناصر الاتصال التعليمي ؟ #م4.19

Translate Tweet

9:53 PM - 4 Mar 2017

1 Retweet 1 Like

5 1 1

Add another Tweet

6 May 2017

Replying to

Translate Tweet

This Tweet is unavailable

Replying to

Translate Tweet

5 Mar 2017

Replying to

Translate Tweet

4 Mar 2017

Replying to

سئل
تقبل
بيئة الاتصال
سأله
انه
تذنيه الراجعة

7 Mar 2017

Replying to

#م4.19

1-الطلاب
2-البيئة التعليمية
3-المعلم
4-الوسائل التعليمية المناسبة

Translate Tweet

7 Mar 2017

Replying to

1 - المعلم 2- المكان التعليمي 3 - الأدوات التعليمية المناسبة 4 - الطالب .

Translate Tweet

This Tweet is unavailable

7 Mar 2017

Replying to

الوسائل التعليمية المناسبة للموقف التعليمي .

Translate Tweet

7 Mar 2017

Replying to

- الطلاب
- المعلمين
- البيئة التعليمية
- الوسائل التعليمية المناسبة للموقف
- المنهاج التعليمي
- مصادر المعرفة المساندة

ما فرق بين الوسائل التعليمية وتكنولوجيا التعليم ؟ #م٤٠٢١

Translate Tweet

2:18 AM - 21 Feb 2017

9 1 0 0

Add another Tweet

This Tweet is unavailable

Replying to [User] · 28 Feb 2017

#م٤٠٢١

هي اجهزة وادوات ومواد يستخدمها المعلم لتحسين عملية التعلم والتعليم...

تكنولوجيا التعليم :

هي عملية متكاملة تقوم على تطبيق هيكل من العلوم والمعرفة عن التعليم الانساني واستخدام مصادر تعلم بشريه وغير بشريه تؤكد نشاط المتعلم وفرديته بمنهجية اسلوب المنظومات لتحقيق الاهداف التعليمية والتوصل لتعلم اكثر فعالية..

Replying to [User] · 26 Feb 2017

#م٤٠٢١

تكنولوجيا التعليم لا تقتصر على الوسائل التعليمية .. والوسائل التعليمية تمثل جزء تكنولوجيا التعليم وهي منها

Translate Tweet

Replying to [User] · 23 Feb 2017

١ - تكنولوجيا التعليم ليست مسمى جديد لمفهوم الوسائل

بالتعاون مع زملائك : اكتب (٤) من عناصر العملية التعليمية ؟ #م٤٠٢١

Translate Tweet

1:10 AM - 7 Mar 2017

1 Retweet

16 1 0 0

Add another Tweet

Replying to [User] · 7 Mar 2017

1- الطالب
2- المدرس
3- البيئة التعليمية
4- المنهج التعليمي

Translate Tweet

This Tweet is unavailable

Replying to [User] · 7 Mar 2017

#م٤٠٢١

1- الطالب 2- المعلم 3- البيئة التعليمية 4- المنهج

Translate Tweet

Replying to [User] · 7 Mar 2017

#م٤٠٢١

1 المعلم 2 الطالب 3 البيئة التعليمية 4 الوسائل التعليمية المناسبة

Translate Tweet

Replying to [User] · 7 Mar 2017

#م٤٠٢١

1- المعلم 2- الطالب 3- البيئة التعليمية 4- المنهج

Translate Tweet

Replying to [User] · 7 Mar 2017

#م٤٠٢١

1- المعلم 2- الطالب 3- البيئة التعليمية 4- الوسائل التعليمية

You Retweeted 28 Mar 2017

أكتب تقريراً عن أهم المواقع الإلكترونية التي يمكن استخدامها في عملية التعليم والتعلم، على أن يحتوي التقرير على:

- 1- اسم الموقع وعنوانه على شبكة الإنترنت
- 2- مجاله التعليمي
- 3- أهميته في عملية التعليم والتعلم؟ ومميزاته
- 4- دور المعلم والتعلم
- 5- مميزات استخدامه
- 6- المشكلات التعليمية التي تتطلب مديراً لموقع؟

You Retweeted 13 Mar 2017

موضوع المحاضرة القادمة (تكليف):

أكتب تقريراً كاملاً عن أهم الأجهزة المستخدمة في الفصول التعليمية (بكتبي بجهازين)، على أن يتضمن التقرير (الذي سوف تتم مناقشته فردياً مع كل طالب) النقاط التالية:

- اسم الجهاز مع صورة حديثة للجهاز
- مميزات استخدامه في التعليم
- كيف يمكن للمعلم أن يستخدمه بطريقة فعالة
- ما هي المشكلات التي يمكن أن يساعد استخدام الجهاز في التغلب عليها داخل الفصل
- ما هي مميزات استخدام الجهاز في الفصل
- الجدوى الاقتصادية من استخدامه (في ضوء ثمنه وعدد مرات استخدامه وعدد الطلاب المستفيدين)
- ما هي أهم المواد الدراسية التي يمكن أن يستخدم في تدريسها؟

#٤٠٢٥

تكليف المحاضرة

ما هي معايير التي يجب أن يراعيها المعلم عند استخدام الصور التعليمية في شرح موضوع ما؟

12:31 AM - 26 Feb 2017

1 Like

7

Add another Tweet

4 Mar 2017

Replying to

يشترط فيها أن تكون:

- واضحة
- أن تساعد على بلوغ الهدف من الدرس وتيسره
- أن تنمي معلومات المتعلم وتفتح آفاقه المعرفية
- أن تمكنه من التركيز على الجوانب المهمة منها
- أن تكون حديثة، دقيقة لافتة للانتباه، مثيرة للنقاش، حاملة للمعلومات الرئيسية، أي متضمنة محتوى الرسالة الخطابية.

4 Mar 2017

Replying to

ان تكون مناسبة لأعمال التلاميذ وقدراتهم العقلية
ان يكون المعلم مقتن بما يقوم به من الوسائل
ان تكون ذات قيمة تربوية واضحة

Translate Tweet

1 Mar 2017

Replying to

ان تكون لها علاقة بالاهداف التي نسعى الى تحقيقها. ان تكون أكثر فاعلية. ان تكون داعمة للمتعلمين. ان تكون واضحة وسهلة الفهم.

Translate Tweet

You Retweeted · 28 Feb 2017

هرم الجارنيل للخبرة

20 Feb 2017

خصائص عملية الاتصال:

- ١ - الاتصال عملية هادفة
- ٢ - الاتصال عملية ديناميكية
- ٣ - الاتصال عملية منظمة
- ٤ - الاتصال عملية دائرية
- ٥ - الاتصال عملية متنوعة

You Retweeted · 8 Mar 2017

الاحسن لفتح إنتاج المواد التعليمية هي :

- ١-إضافة
- ٢-إضافة
- ٣-إضافة
- ٤-إضافة
- ٥-تدوين المواد التعليمية

#3م1٠٣1

You Retweeted · 7 Mar 2017

Replying to #3م1٠٣1

You Retweeted · 7 Mar 2017

Replying to #3م1٠٣1

- ١-تحديد الهدف
- ٢ - تحديد طريقة التعليم او التعلم
- ٣- تحديد خصائص المتعلمين
- ٤- تحديد شكل ونوع المادة
- ٥ -إعداد مخطط كروكي
- ٦-التقويم والمتابعة

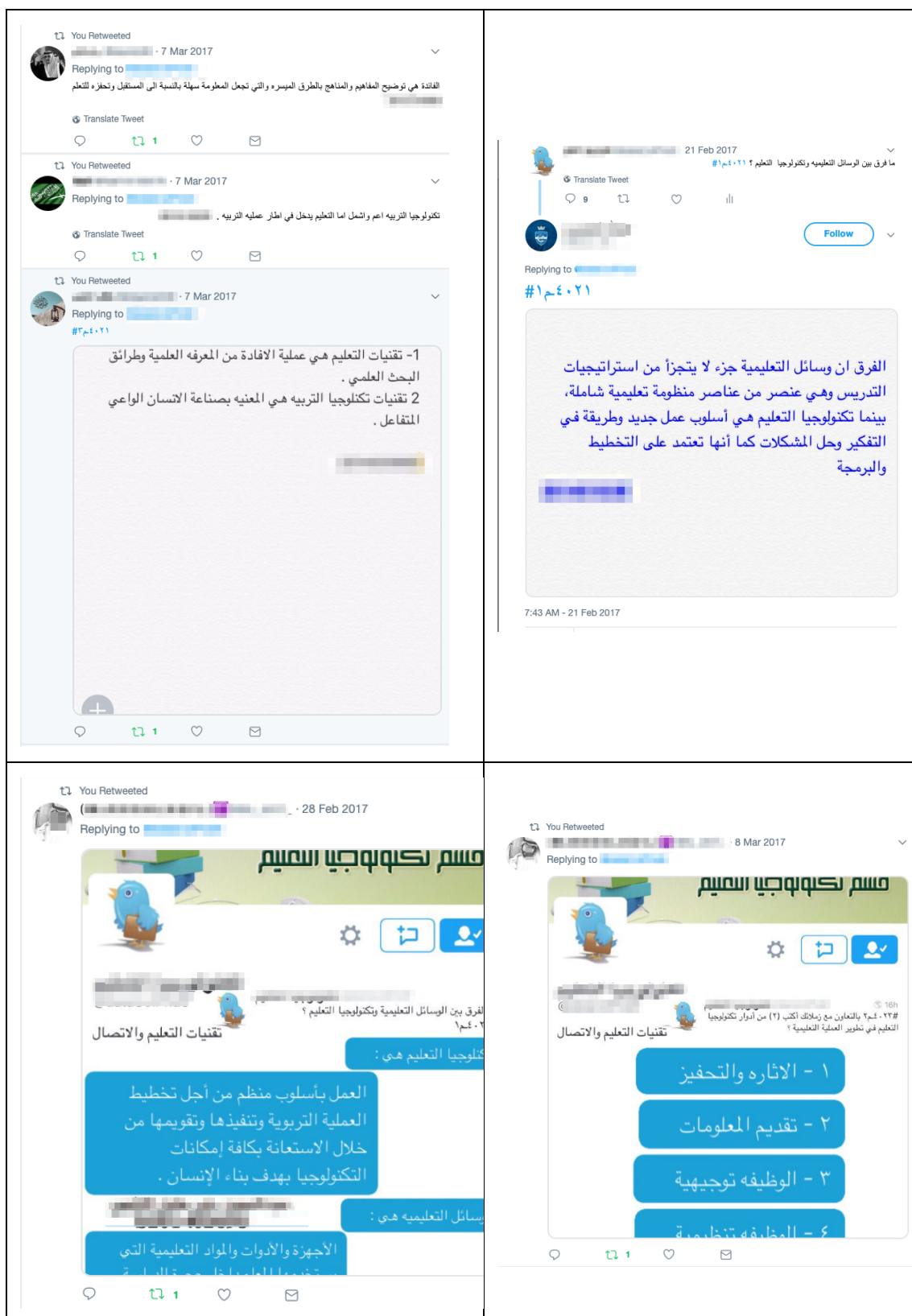
You Retweeted · 6 Mar 2017

You Retweeted · 24 Mar 2017

مميزات الكاميرا الحديثة: وجود شاشة عرض الصور - وجود ذاكرة تخزين كبيرة - جوب الكاميرا القديمة لا يوجد فيها شاشة عرض صورة

You Retweeted · 21 Mar 2017

أسس نظام الرسوم التعليمية:
يجب أن تكون على شكل أحد الحروف التالية:
ZSLCTO





You Retweeted

7 Mar 2017

#٢٤٠٣١








7 Mar 2017

#٢٤٠٣١

في خطوات انتاج المواد التعليمية ؟

Translate Tweet

5

 You Retweeted  · 16 Apr 2017

عزيزي الطالب :
الرجاء التكرم بتعبئة الاستبانة التالية..
durham.onlinesurveys.ac.uk/twitter-questi...

  1  

  · 5 Apr 2017

 You Retweeted  · 5 Apr 2017

مطلعاً فقط : التعلم النشط والتعلم التقليدي.
youtube.com/watch?v=PvMAhH...

  1  2 

 You Retweeted  · 26 Mar 2017

Replying to 

أرايك في استخدام الوبويت ؟ تسهيل عليه التعليم ٢-مواكبه التطور ٣ -

  1  

 You Retweeted  · 26 Mar 2017

Replying to 

إيعاء : التلقيذ
فأساساً : مرحلة التكوين التي تحدد مدى صلاحية التقنيات المستخدمة ونقاط الضعف، ونقاط القوة فيها.

  1  

 You Retweeted  · 26 Mar 2017

Replying to 

ولا: تحديد الاهداف من وراء تناول هذا الموضوع
أولاً: تصميم البيئة التعليمية.
ثانياً: اختيار وتجربة التقنيات المناسبة.

  1  

مثال في الصورة التعليلية على شكل T

5 Mar 2017

Translate Tweet

2

You Retweeted

Replied to

5 Mar 2017

Translate Tweet

Product (Industry) Life Cycle stages

Profit

Time

Introduction

Growth

Maturity

Decline

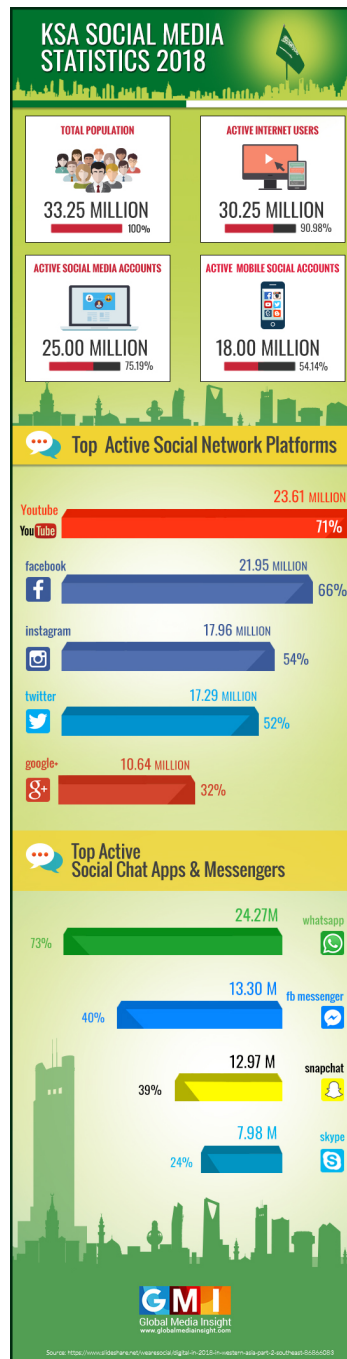
www.12menage.com

Use the interactive table to view tool categories

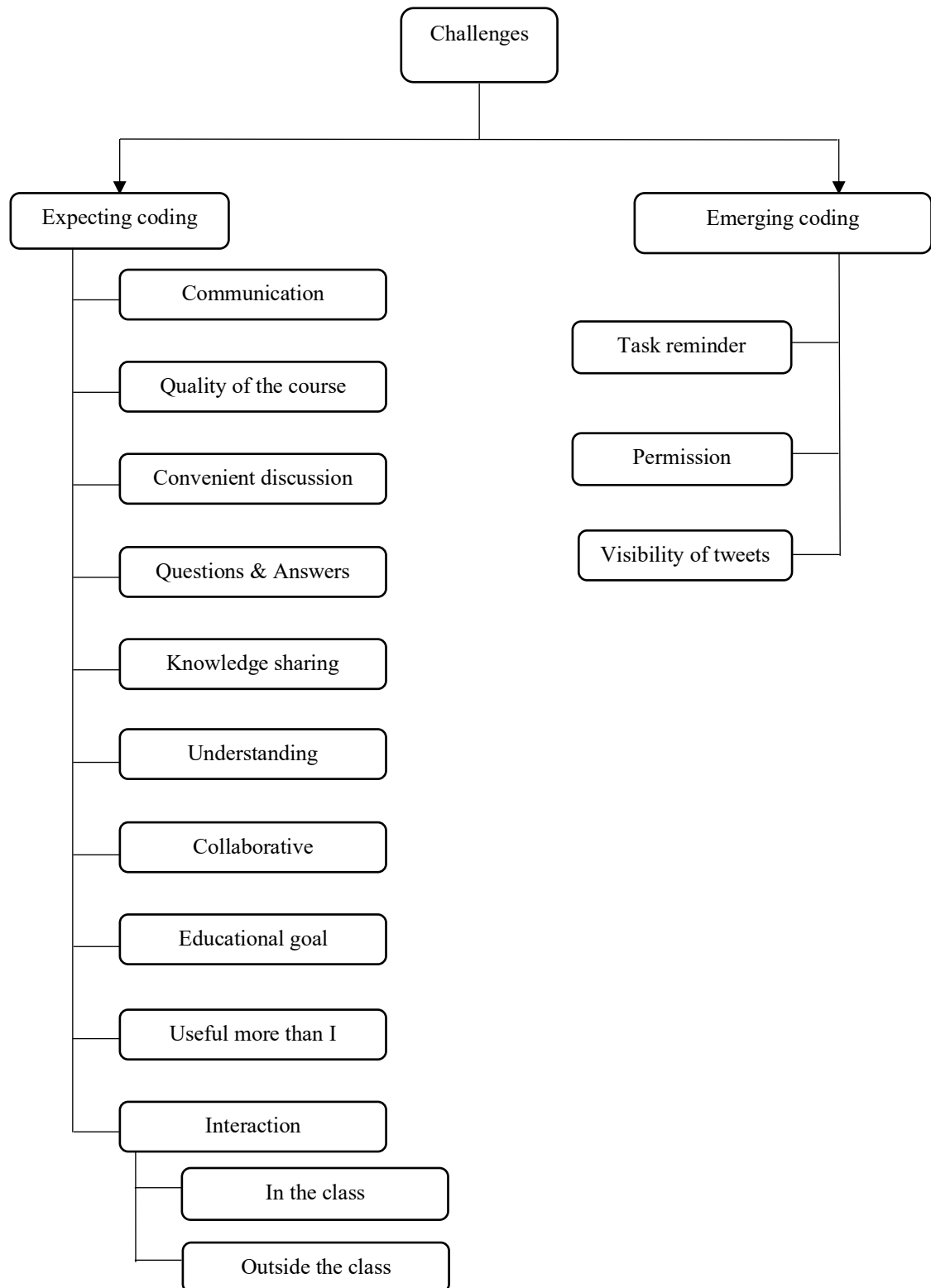
Top 200 Tools for Learning 2018

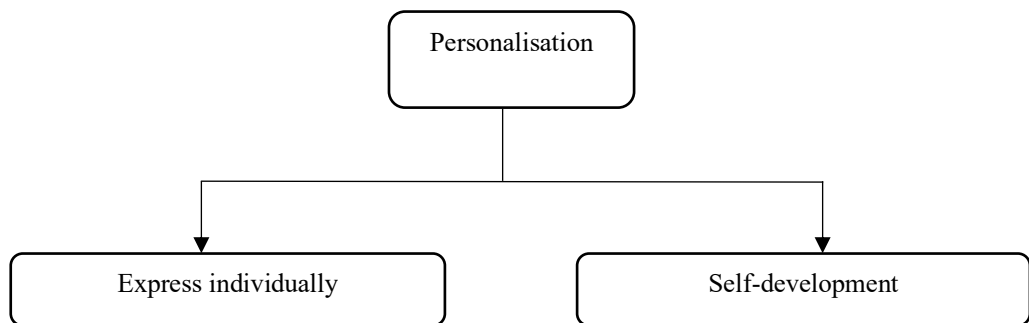
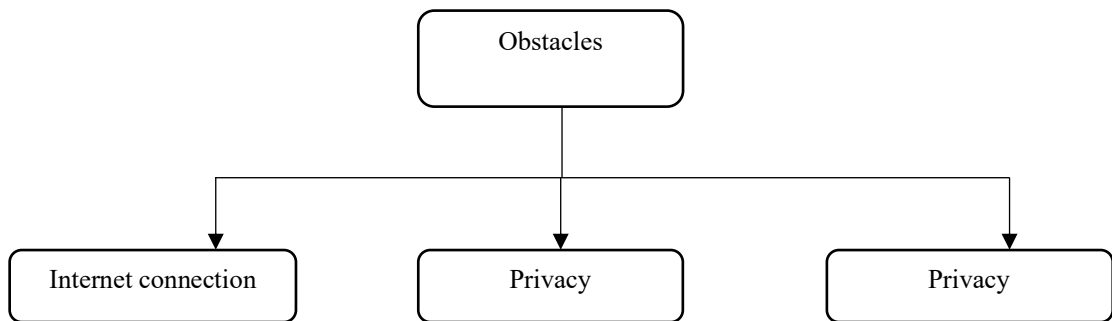
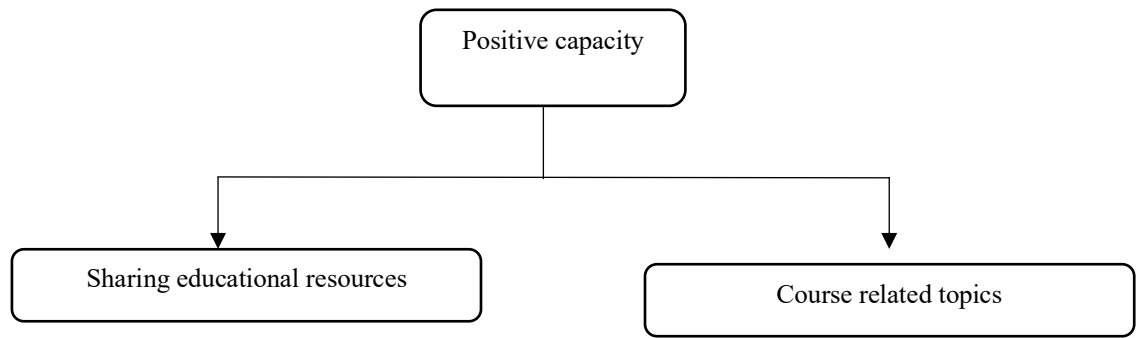
Compiled by Jane Hart from the results of the 12th Annual Digital Learning Tools survey

Appendix H: Social media statistics in Saudi Arabia for 2018



Appendix I: The codes for the interviews





Example from students' interviews	Codes	Themes
<ul style="list-style-type: none"> • Yes, we had the opportunities to know each other more in the class. • Easy to contact with friends 	Communication	Challenges
<ul style="list-style-type: none"> • It is easy to use pictures and videos to support the topic. • pictures are attractive; they combine more than one idea in one picture 	Quality of the courses	Challenges
<ul style="list-style-type: none"> • Yes, it is easy to respond and involve in the classroom discussion. Twitter is easier than pen and paper as we some time forget to bring them to the class. • It is easy to get back to the information • Yes, it easy to connect and discuss with friends for learning purposes and talking about the requirement. • Using hashtag in Twitter better than papers or WhatsApp in terms of organisation. For instance, each lesson or task are categorized separately from others. (Hashtags or tweet and comments). 	convenient discussion	Challenges
<ul style="list-style-type: none"> • Yes, Twitter helps us in answering our friends' questions. • Help us with responding to the questions • I find it easy to ask when I have question for my friends 	Question & Answers	Challenges
<ul style="list-style-type: none"> • Yes, we benefit from our question /answers such as I had chance to look at my friends answer/reply in Twitter. • Yes, I search for other students answer and read them, it increases our critical thinking by comparing it with my answer and we can evaluate others responses. 	Visibility of tweets	Challenges
<ul style="list-style-type: none"> • Yes, it is easy to know my friends' answers and compare them with my own answer • I check all the possible answers before responding to the required task. This can enrich my own answer, when I brows other students' answers. • I find Twitter adds some information to what I already have. • I like the idea of sharing the information among us. • Twitter for a wide range of people, it is better in sharing knowledge with others from different classes. Sometimes I look and search for other classes' tweets within the same subjects. 	Knowledge sharing	Challenges
<ul style="list-style-type: none"> • I find it helpful when I don't understand. • I found it useful when I read other students' responses. Sometimes, I delete my answer and correct it. • Twitter offers me an opportunity to correct my misunderstanding and expanding my answer. • It helps me to improve my knowledge. • Summary of classroom lectures 	Understanding	Challenges
<ul style="list-style-type: none"> • Twitter encouraged us to participate and interactions with each other. 	Collaboration	Challenges
<ul style="list-style-type: none"> • In Twitter, I can find everything I want in regard to my study, I don't need to contact my friends to ask them about the required tasks • I can access at any time. I am able to ask about the task even when I am absent. 	Educational goal via sharing	Challenges
<ul style="list-style-type: none"> • It helps me in the exam, I used it as the source for revising 	Activates after classroom	Challenges
<ul style="list-style-type: none"> • At the beginning, I thought it could be difficult to use Twitter for learning purposes, but I discovered it is not. 	Useful more than I thought	Challenges
<ul style="list-style-type: none"> • We exchange our answers and correct for each other either face to face or in Twitter during class time. • It is open for all students not only from the class, Twitter better than traditional class, it changes the classroom 	Interaction in the class	Challenges

<ul style="list-style-type: none"> • routines. Twitter less than WhatsApp in word account so it is direct to the point. • It increases our interaction with each other in the class such as I am able to interact with all students 		
<ul style="list-style-type: none"> • (I repeated the subject for the second time). Using Twitter changes class environment to be more active. I prefer it, compared to the last semester which we didn't use Twitter in the classroom. 	Activates in classroom	Challenges
<ul style="list-style-type: none"> • I got benefit from other students in different courses. • It helps us in short classes, extending some discussion after class time. 	Interaction outside the class	Challenges
<ul style="list-style-type: none"> • We remind each other about the tasks. • Twitter has reminded us and it is easy to check the requirement 	Task reminder	Challenges
<ul style="list-style-type: none"> • Yes, I contacted my lecturer with regard to have an excuse for not attending class. I get quick response. 	Permission	Challenges
<ul style="list-style-type: none"> • Yes, I am able to share all the related and various tweets with regard to educational topic, and I can ask for assistance if I need to. 	Sharing educational recourse	Positive capacity
<ul style="list-style-type: none"> • Yes, I like the way we think together in the classroom then we respond to the class Hashtag • Help me when I don't go the class. 	Course related topic	Positive capacity
<ul style="list-style-type: none"> • Twitter needs an internet connection. 	Internet connection	Obstacles
<ul style="list-style-type: none"> • Prefer not public and open tool, I like limited too for class only 	Privacy	Obstacles
<ul style="list-style-type: none"> • Yes, in the class, I check other tweets which are not related to the topic sometime. 	Distraction	Obstacles
<ul style="list-style-type: none"> • Twitter is better because I can take my time in responding and it is reduced the level of shyness. • I can answer at any time after more reading. 	Express individuality	Personalisation
<ul style="list-style-type: none"> • I use it more for developing my skill such as asking people about English language vocabularies, especially, when the vocabularies are not clear in google translation • Yes, for self-development outside the university. 	Self-development	Personalisation

Questions	Codes	Themes
<ul style="list-style-type: none"> • Was Twitter useful in your learning environment including social learning? How? Why? Example? • How does Twitter assist you in relation to your social learning? Example? 	Communication	Challenges
<ul style="list-style-type: none"> • What makes Twitter unique in social learning compared with other aspects, for example, Facebook, pen and paper? How? Example? 	Quality of the courses	Challenges

<ul style="list-style-type: none"> • Was Twitter useful in your learning environment including social learning? How? Why? Example? • What features does twitter offer? How? Example? 	Convenient discussion	Challenges
<ul style="list-style-type: none"> • Was Twitter useful in your learning environment including social learning? How? Why? Example? • How does Twitter assist you in relation to your social learning? Example? • How does Twitter assist your learning with friends? Example? 	Question & Answers	Challenges
<ul style="list-style-type: none"> • Was Twitter useful in your learning environment including social learning? How? Why? Example? • How does Twitter assist you in relation to your social learning? Example? • How does Twitter assist your learning with friends? Example? • Did the use of Twitter make you want to use social learning more? If yes, how? Example? • What makes Twitter unique in social learning compared with other aspects, for example, Facebook, pen and paper? How? Example? 	Knowledge sharing	Challenges
<ul style="list-style-type: none"> • Was Twitter useful in your learning environment including social learning? How? Why? Example? • How does Twitter assist you in relation to your social learning? Example? • What features does twitter offer? How? Example? • What makes Twitter unique in social learning compared with other aspects, for example, Facebook, pen and paper? How? Example? • How does Twitter assist your understanding of an educational topic? Example 	Understanding	Challenges
<ul style="list-style-type: none"> • How does Twitter assist you in relation to your social learning? Example? 	Collaboration	Challenges
<ul style="list-style-type: none"> • What features does twitter offer? How? Example? • What makes Twitter unique in social learning compared with other aspects, for example, Facebook, pen and paper? How? Example? • Did you use the discussed information as a source for your exam? Example? • 	Educational goal	Challenges
<ul style="list-style-type: none"> • Did twitter work out the way you expected? Are you upset about anything? Did you find anything funny? 	Useful more than I thought	Challenges
<ul style="list-style-type: none"> • How does Twitter assist your learning with friends? Example? • What makes Twitter unique in social learning compared with other aspects, for example, Facebook, pen and paper? How? Example? • How does Twitter assist your understanding of an educational topic? Example? 	Interaction in the class	Challenges

<ul style="list-style-type: none"> • What makes Twitter unique in social learning compared with other aspects, for example, Facebook, pen and paper? How? Example? • How does Twitter assist your understanding of an educational topic? Example? • How does Twitter assist your understanding of an educational topic? Example? 	Interaction outside the class	Challenges
<ul style="list-style-type: none"> • How does Twitter assist your learning with friends? Example? 	Task reminder	Challenges
<ul style="list-style-type: none"> • How does Twitter connect you to your instructor? Example? 	Permission	Challenges
<ul style="list-style-type: none"> • Was Twitter useful in your learning environment including social learning? How? Why? Example? 	Sharing educational recourse	Positive capacity
<ul style="list-style-type: none"> • Was Twitter useful in your learning environment including social learning? How? Why? Example? • How does Twitter assist you in relation to your social learning? Example? 	Course related topic	Positive capacity
<ul style="list-style-type: none"> • Was Twitter useful in your learning environment including social learning? How? Why? Example? 	Internet connection	Obstacles
<ul style="list-style-type: none"> • Was Twitter useful in your learning environment including social learning? How? Why? Example? 	Privacy	Obstacles
<ul style="list-style-type: none"> • How did Twitter obstruct your studying? Example? 	Distraction	Obstacles
<ul style="list-style-type: none"> • Did the discussion on Twitter differ from discussion in the class? How? 	Express individuality	Personalisation
<ul style="list-style-type: none"> • Was Twitter useful in your learning environment including social learning? How? Why? Example? 	Self-development	Personalisation